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MORGAN COUNTY
MEDICAL SOCIETY.

SYSTEM

OF

URGERY.

BY

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IRELAND AND EDINBURGH,
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A TREATISE

RGAN COUNTY MEDICAL SOCIETY.

A TREATISE ON THE THEORY AND PRACTICE OF SURGERY.

CHAPTER XXVII.

SECTION XIX.

Additional Remarks on Diſeaſes of the Eyes.

IN the laſt volume of this work, I treated ſo fully of the diſeaſes of the eyes, that it was not my intention to ſay any thing farther upon them: But ſince the publication of that volume, a foreign oculiſt, Mr. Jean François Pellier, having appeared in this country, where he has already acquired much reputation, I conſider it as a neceſſary addition to the chapter on theſe diſeaſes, to communicate ſuch parts of Mr. Pellier's practice as appear to be of importance. Poſſeſſing the advantages of a liberal education, a ſound judgment, and much experience, Mr.

Pellier has been enabled to ſuggeſt improvements in the treatment of almoſt every diſeaſe to which the eyes are liable; and an uncommon degree of ſteadineſs, conjoined to a quick eye-ſight, give him a command of himſelf and a facility of operating which is not often attained. I think it proper likewiſe to remark, that Mr. Pellier communicated his knowledge of the diſeaſes of the eyes in the moſt candid manner; which puts it in my power to lay his obſervations before the Public, he having given me permiſſion to do ſo.

While, by giving an early account of material improvements, I thus acquit myſelf of an obligation to the Public, I at the ſame time embrace, with much ſatisfaction, the opportunity which it affords of announcing the merit of an operator, who, although a ſtranger, and as yet not much known in this country, is perhaps one of the beſt oculiſts now in Europe.

In the firſt place, I ſhall mention what I have learned of Mr. Pellier's practice; and ſhall then offer ſuch remarks as occur to me upon it.

On the ſubject of the cataract his obſervations are particularly valuable. By attentive examination he can almoſt in every inſtance ſay whether a cataract is hard, ſomewhat ſoft, or altogether fluid; and as his method of operating varies according to theſe circumſtances, it is of importance to be able to determine à priori with regard to them. He can alſo aſcertain whether a cataract is of a large or ſmall ſize; by which he is often directed in the different ſteps of the operation.

I know that theſe are circumſtances which practitioners in general conſider it as impoſſible to judge of with any degree of preciſion, particularly with reſpect to the conſiſtence of cataracts; and I muſt acknowledge, that I was clearly of this opinion, till of late that I was convinced of the contrary, not by Mr. Pellier's aſſertion alone, but by different proofs of the fact. I aſſiſted Mr. Pellier in different caſes where the cataract was extracted: in all of them he previouſly foretold the conſiſtence and ſize of the cataract with perfect confidence; and in every inſtance his prognoſis was preciſe and accurate. I am credibly informed, too, that this happened with other practitioners in whoſe preſence he operated in different parts of this country.

Mr. Pellier's definition of a cataract is, That it is a morbid affection attended with different degrees of opacity either in the lens itſelf; in the ſmall quantity of fluid with which the lens is ſurrounded; or in the capſule which contains it.

He diſtinguiſhes ſeveral varieties of cataract, which in practice ought to be kept in view.

The three principal varieties which he mentions are the true or curable cataract; the mixed or doubtful kind; and the falſe or incurable.

1. The curable, or what he terms the true cataract, is known by the pupil retaining its natural power of contracting and dilating in full perfection, while the patient is at the ſame time able to diſtinguiſh the light of a candle, or of any other luminous body, and even certain bright colours, ſuch as red, green, &c.

2. The mixed or doubtful cataract is attended with a weak feeble contraction and dilation of the pupil, and the patient can ſcarcely diſtinguiſh light from darkneſs. Along with an opacity of the cryſtalline, this is ſuppoſed to be attended with an affection of the retina, or of ſome other part of the eye.

3. In the falſe or incurable cataract, along with an opake ſtate of the lens, there is evidently a diſeaſed ſtate of the pupil, which remains always immoveable to whatever degree of light it may be expoſed, at the ſame time that the patient does not diſtinguiſh between the moſt brilliant light and perfect darkneſs.

Cataracts may be either ſimple or compound, or they may be complicated with other affections.

1. A ſimple cataract is a mere opacity of the cryſtalline lens, all the other parts of the eye remaining perfectly ſound.

2. A cataract is ſaid to be of a compound nature, when blindneſs is produced by an opake ſtate of the body of the lens, of the liquor which ſurrounds it, and of the capſule.

3. The diſeaſe is conſidered as complex, when it is conjoined with other affections of the internal parts of the eye; the moſt frequent of which is an amauroſis.

It is not unfrequently, too, attended with a diſſolution of the vitreous humour, and ſometimes with an opacity of it. This variety of the diſeaſe is for the moſt part produced by violent inflammation. It is eaſily diſtinguiſhed by thoſe accuſtomed to an attentive examination of the eye; and it is particularly neceſſary for operators to be well acquainted with it; for no operation, neither extraction nor depreſſion, ſhould be ever adviſed for it. The operation has never in any inſtance of this ſpecies of cataract been known to ſucceed; and for the moſt part, Mr. Pellier obſerves, it is productive of very dreadful pain, and the moſt violent degree of inflammation that he ever met with. In general, too, the pain and inflammation thus induced remain fixed and permanent, without yielding in any degree to the remedies employed for it.

Cataracts are ſometimes attended, too, with an imperforated iris; in which caſe, as no light can paſs to the bottom of the eye, there is no degree of viſion whatever; and at other times they are complicated with adheſions, either to the iris, or to the capſule of the vitreous humor. Preternatural adheſions of the lens to the capſule of the vitreous humor can ſcarcely be diſtinguiſhed by the eye; but they are very commonly met with where the diſeaſe has been originally produced by, or attended with, much inflammation; and they always render the operations of extraction and couching difficult. It is this kind of adheſion, Mr. Pellier imagines, which prevents the operation of couching from ſucceeding ſo frequently as it otherwiſe might do; for when it takes place in any degree, the cataract, he ſuppoſes, will always riſe again on the needle being removed from it.

In forming an opinion of cataracts from the ſeat of the diſeaſe, there are different circumſtances which require attention.

1. It often happens, as we have already remarked, that the lens only is affected. This variety of the diſeaſe is moſt frequent, Mr. Pellier obſerves, in adults, and eſpecially in old age.

2. When the opacity is ſeated in the capſule of the lens, if the anterior part of it only is diſeaſed, it appears to be remarkably white, and to be placed very contiguous to the iris; while, on the contrary, if the poſterior part of it only is affected, it is commonly of a grey colour, and the opacity appears to be deeply ſeated.

It ſometimes happens, both after the operation of extraction and couching, that in the courſe of ten or twelve days, the capſule of the lens, which at firſt was perfectly ſound, becomes quite opake. This variety of the diſeaſe Mr. Pellier terms the Cataracte Secondaire.

3. When the body of the lens and its capſule are both opake, it commonly happens that the cataract is ſoft, or even altogether fluid. In this caſe, much attention is neceſſary in the operation of extraction, to prevent the capſule from burſting: a degree of nicety, Mr. Pellier obſerves, which thoſe not much accuſtomed to this branch of practice can ſeldom arrive at, but which is very practicable with thoſe who have had much experience in it.

4. In ſome inſtances cataracts appear to proceed from a partial affection of the lens, ſmall opake ſpots being obſerved in it, while the reſt of it remains ſound. In this caſe, viſion is always moſt perfect in an obſcure light when the pupil is moſt dilated.

In judging of cataracts from their conſiſtence, there are three circumſtances which more particularly require attention.

1. When a cataract is of a firm conſiſtence, it is in almoſt every inſtance of a brown colour; it appears in general directly behind the iris, and not ſo deep as the lens is uſually placed, and the pupil dilates and contracts very ſlowly.

2. When it is fluid, it is not commonly white, but rather of a cream colour, ſomewhat reſembling purulent matter; and for the moſt part in this variety of the diſeaſe the globe of the eye appears full, and ſomewhat larger than uſual.

3. It ſometimes happens, Mr. Pellier obſerves, that along with this fluid ſtate of a cataract, the capſule is conſiderably thickened. To this he gives the appellation of the Cyſtic Cataract.

The colour of a cataract is another point of importance.

1. We have juſt obſerved, that a thin fluid cataract is for the moſt part of a cream colour; but in that variety of the diſeaſe which is obſerved in children at birth, although it is always fluid, the colour is almoſt always a milk white. In general, however, at other periods of life, a white cataract is of a cheeſy conſiſtence.

2. When a cataract is of a yellow colour, a ſmall portion of the lens commonly remains hard, the reſt of it being diſſolved into a thin tranſparent fluid, forming that variety of the diſeaſe uſually termed the Hydatid Cataract.

3. Although a black cataract is not a common occurrence, Mr. Pellier ſays he has met with different inſtances of it. The only diſeaſe for which it may be miſtaken is the gutta ſerena; but it may be diſtinguiſhed from it by attention and obſervation. In the gutta ſerena the diſeaſe for the moſt part comes on ſuddenly, the pupil is of a deep black, it remains immoveable in every degree of light, and the patient cannot diſtinguiſh colours, or the cleareſt light from perfect darkneſs; whereas, in the black cataract, the acceſſion of blindneſs is commonly ſlow and gradual;

PLATE XXXIX.

FIG. 1.

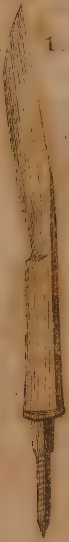


FIG. 2.

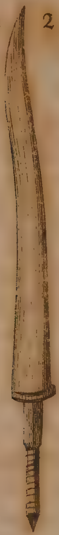


FIG. 3.

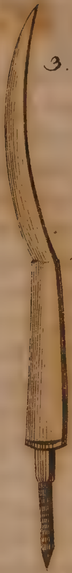


FIG. 4.

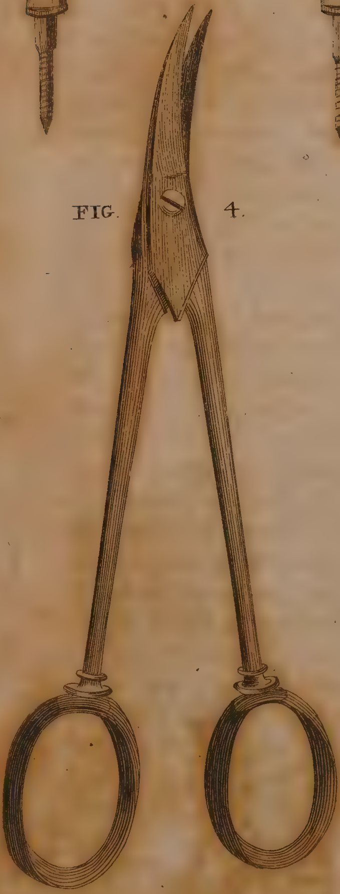
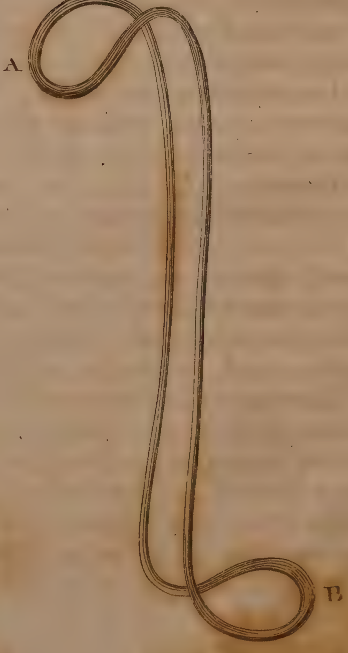


FIG 5.



the pupil contracts and dilates according to the degree of light to which it is expoſed; the bottom of the eye is of a dark colour, but not of ſuch a deep black as in the gutta ſerena; and the patient can diſtinguiſh light and vivid colours. In ſhort, the ſymptoms of this variety of the diſeaſe are exactly the ſame with thoſe of the common cataract; only, inſtead of being white, the opacity is black.

With reſpect to the maturity or ripeneſs of a cataract, Mr. Pellier pays no regard either to the colour or conſiſtence of the lens. He always conſiders the operation as proper, when the opacity has proceeded ſo far as to deprive the patient of ſight, when it is not complicated with ſome other incurable diſeaſe, and when the habit of body is good. He prefers the method of cure by extraction, excepting in a few caſes where the pupil is extremely ſmall, when he operates by depreſſion. He always prepares his patients for the operation, by confining them to a low diet for five or ſix days; by giving two or three doſes of ſalts and ſenna; and when they are plethoric, he takes away ten or twelve ounces of blood.

In extracting the cataract, he makes the inciſion of the cornea in the ordinary place and of the uſual ſize; but he has ſome peculiarities in his method of doing it.

Inſtead of placing his patient with his face oppoſite to a clear light, he ſeats him with his ſide towards it. If he is to operate upon the left eye, he uſes his right hand, and the right ſide of the patient is placed towards the window. He always uſes his left hand in operating upon the right eye; and in this caſe the patient is made to ſit with his left ſide towards the light.

The patient being ſeated with the eye which is not to be operated upon tied down with a bandage, an aſſiſtant ſupports his head behind, while at the ſame time he fixes the eye with the ſpeculum, fig. 5. Plate XXXIX. The figure repreſents the inſtrument of the full ſize. It is made of wire; and it may either be of gold, ſilver, or any other metal. The head being fixed by preſſing it againſt the breaſt with one hand under the chin, the aſſiſtant takes this inſtrument in the other; and placing the round curvature A, upon the upper eye lid immediately behind the tarſus or cartilage, he muſt by gentle gradual preſſure fix the eye above, while the operator with the fore and middle fingers of his left hand, when the operation is to be done upon the left eye, muſt fix it below, at the ſame time that he draws down the under eye lid. In uſing this ſpeculum the upper eye lid is forced almoſt entirely into the orbit, but it immediately returns to its natural ſituation on the inſtrument being withdrawn.

The eye being thus fixed, the knife, fig. 1. Plate XXXIX. fixed in its handle, muſt be put into the operator's right hand, who now divides the cornea in the uſual manner: but when the point of it comes oppoſite to the pupil, if the capſule of the lens is to be divided, Mr. Pellier has arrived at ſuch dexterity in this operation, that he plunges the point of the knife through the pupil into the lens; and withdrawing it gently, he carries the point of it forward to the oppoſite ſide of the eye, and finiſhes the operation in the uſual way. But in making the latter part of the inciſion, he is very attentive to the preſſure made by the ſpeculum, which he deſires the aſſiſtant to remove entirely before the inciſion is completed, in order to prevent the vitreous humor from eſcaping.

This being done, the eyelids are immediately ſhut; and while they are in this ſtate, a ſlow, gradual preſſure is made upon the eye ball, with the flat end of the inſtrument, which he terms a Curette, fig. 1. Plate XLII. which is placed immediately above the tarſus of the upper eye lid. As the acceſs of light to the eye is thus prevented, the pupil remains in a ſtate of dilation, by which the lens is more eaſily preſſed out than it otherwiſe could be; and if the preſſure be applied in a cautious manner, no part of the vitreous humor is ever forced out.

When the cataract does not come out entire, which is ſometimes the caſe, or when it is found to adhere to the contiguous parts, the end of the curette is introduced through the pupil, and with it any adheſions that occur are gradually ſeparated; at the ſame time that any detached pieces of the lens are turned out through the opening in the cornea: Or, inſtead of the curette, the ciſtotome, fig. 3. Plate XL. is ſometimes employed for ſeparating ſuch adheſions.

In the courſe of this operation, it ſometimes happens that the iris is forced too much forward into the anterior chamber of the eye, or even altogether through the inciſion in the cornea. With a view to prevent the bad effects which might reſult from this, Mr. Pellier inſinuates the flat ſide of the curette into the wound in the cornea, ſo as to preſs the iris into its natural ſituation.

This is the uſual method in which Mr. Pellier performs this operation; but circumſtances ſometimes occur which require ſome peculiarity of management. The moſt material of which are theſe: When he has reaſon to conclude that the cataract is in a fluid ſtate without any opacity of the capſule, inſtead of making any opening into the cornea of the uſual ſize, he introduces a ſharp pointed knife, ſomewhat convex on the back, into the inferior part of the tranſparent cornea at a proper diſtance from the iris; and having made an inciſion of about the tenth part of an inch in length, he puſhes the point of the inſtrument upwards till it comes oppoſite to the pupil, when he carries it cautiouſly on till it reaches the lens; and having now made an opening in the capſule ſufficiently large for diſcharging the fluid contained in it, he withdraws the inſtrument with the ſame caution with which it was introduced, and in this manner the operation is finiſhed; as the cataract being in a ſtate of fluidity, it paſſes eaſily off without any preſſure.

When, again, along with a ſoft or fluid cataract, there is reaſon to ſuppoſe that any part of the capſule is opake, or even where the capſule alone is ſuppoſed to be diſeaſed, he carefully avoids opening it or burſting it in the courſe of the operation: in either of theſe events, he ſays, it would be with difficulty extracted. He therefore by ſlow gradual preſſure with the curette, in the manner we have mentioned, forces out the lens, contained, as he imagines, in its capſule or cyſt; and he does it, he ſays, in every inſtance without forcing out any part of the vitreous humor. In ſome caſes, however, he finds it neceſſary to introduce the end of the curette through the pupil, and to ſeparate the capſule of the lens from the contiguous parts; but even this, he ſays, does no harm to any part of the eye. The importance of our being able to judge from the appearances of a cataract of the real ſtate of the diſeaſe is therefore ſufficiently obvious, from the difference which this variety of it requires in the method of operating.

In extracting the cataract, it is a matter of the higheſt moment to avoid the iris with the knife; but as this is extremely difficult in eyes that are not very prominent, in ſuch caſes Mr. Pellier employs a knife with that ſide of it convex which paſſes next to the iris. One of theſe inſtruments is repreſented in Plate XXXIX. fig. 2. In every other reſpect it is the ſame with the knife which he uſes in ordinary caſes, repreſented in fig. 1. of the ſame plate.

In the courſe of this operation, it ſometimes happens that the aqueous humour eſcapes in too great quantity before the point of the knife is carried acroſs the eye ſo as to penetrate the oppoſite ſide of the cornea: When this takes place, which it often does when the hand of the operator is not perfectly ſteady, as the iris is apt to paſs in before the point of the inſtrument, Mr. Pellier adviſes the knife to be withdrawn, and the other knife, fig. 3. with a blunt or probe point, to be introduced at the opening in the cornea; and the point being ſlowly carried over to the oppoſite ſide of the eye, an inciſion is there to be made, either with the other ſharp pointed knife or with a common lancet, ſufficiently large for letting out the blunt point of the other; when the operation is to be finiſhed in the uſual way, by puſhing it forward, and making a kind of ſemi circular inciſion in the under part of the cornea.

As ſoon as the cataract is extracted, it is the common practice to preſent a watch or ſome other object to the patient, with a view to diſcover the ſucceſs of the operation. In ſome inſtances Mr. Pellier has been forced to conſent to this, but he does not approve of it. Inſtead of this, he immediately cloſes the eye lids, and covers each eye with a ſmall bag of ſoft old linen or cotton, about half filled with ſoft fine wool. Theſe bags are applied dry, and are fixed with pins to a circular bandage of old linen paſſed round the forehead, which again is kept firm in its ſituation by a ſlip of the ſame linen made to paſs beneath the chin and over the upper part of the head; care being taken to fix them both with pins to the night cap below.

The patient is now to be undreſſed, and with as little exertion as poſſible ſhould be laid in bed, upon his back, with his head very little elevated: and in this ſituation he ſhould remain with as little variation as poſſible during the firſt ſix or eight days, as it tends more than any other he can be placed in to a ſpeedy cure of the wound in the cornea. In the courſe of a few hours after the operation, Mr. Pellier always adviſes blood letting to the extent of eight or ten ounces, excepting in low emaciated conſtitutions. The patient is kept upon a low diet. He gives an opiate; but prefers ſmall doſes frequently repeated to the giving a large doſe at once, which often produces ſickneſs and vomiting, which ſhould by all means be guarded againſt; for nothing ſo readily hurts the eye as the exertion of vomiting, coughing, and ſneezing. For which reaſon he does not admit of tobacco being uſed in any form, for the firſt eight or ten days.

The belly ſhould be kept moderately open by gentle purgatives, and on the fourth or fifth day the dreſſings may be removed; and after clearing the eye of any matter that may have collected, and the eye lid being cautiouſly lifted to examine the ſtate of the wound, the ſame kind bandage muſt be applied again. From this time forward the dreſſing ſhould be renewed every ſecond day, and in ten or twelve days from the operation, the eye ſhould be bathed, before the new bandage is applied with a weak ſaturnine ſolution; but till this period warm milk and water is conſidered as preferable. About the end of the third week the bags of wool, after having been gradually leſſened, may be taken away entirely, and a piece of green ſilk put over the eyes inſtead of them. If no interruption occurs to the cure, the diet may be made gradually better; and when one eye only has been operated upon, Mr. Pellier commonly allows the patient to go abroad at the end of the fourth week, but never ſooner; and even then the eyes are directed to be well covered: But when both eyes have been cut, he adviſes a confinement of at leaſt ſix weeks.

This is the plan of treatment which Mr. Pellier purſues in ordinary caſes; and he attributes much of the ſucceſs with which his operations are attended to a rigid obſervation of theſe regulations. But where there is a particular tendency in the ſyſtem to inflammation, remedies of a different kind are required.

The eye becomes in ſome caſes ſo much inflamed even in the courſe of a few hours from the operation, that one blood letting does not prove ſufficient. In this caſe he adviſes leeches to be applied to the neighbourhood of the eye; and if a ſecond or third general evacuation is neceſſary, he directs the blood to be taken from the foot, as by experience he finds this to prove more ſucceſsful than taking it from the arm or neck. The patient is deſired to drink plentifully of Arabic emulſion, with a large proportion of nitre. The pediluvium frequently repeated is ſuppoſed to prove very ſerviceable. And, for the removal of that violent pain which inflammation ſupervening to this operation commonly excites, nothing that has yet been tried, he thinks, anſwers ſo well as a liniment compoſed of the white of an egg and powdered alum beat for a conſiderable time together : a little of which ſhould be applied to the eye every two hours between two plies of a bit of ſoft old linen. Beſides affording relief from pain, it tends more effectually than any other remedy to ſtop the progreſs of inflammation ; inſomuch, that Mr. Pellier employs it in every caſe as ſoon as the eye begins to inflame.

Inſtead of alum, he ſometimes adds to the white of an egg three grains of white vitriol, and as much of ſaccharum ſaturni diſſolved in a ſpoonful of roſe water ; and the whole being well beat together till it puts on the appearance of white froth, a little of this is inſerted between the eye lids with a ſmall pencil three or four times a day, at the ſame time that the eye lids are covered with a ſmall bag of thin linen in which ſome of it is contained. When the heat and pain attending the inflammation begin to abate, he adviſes a poultice compoſed of a ripe apple well boiled, with the water preſſed out of it, and a ſmall quantity of camphor and powdered ſaffron added to it.

By perſevering duly in theſe means the inflammation is commonly at laſt removed. It is otherwiſe, however, in ſome inſtances : inſomuch, that notwithſtanding the utmoſt attention, every ſymptom is aggravated ; the veſſels of the tunica conjunctiva become extremely turgid ; the eye lids ſwell to a conſiderable ſize ; and the pain, which before was ſevere, is now inſupportable. In this ſituation, nothing has ever any effect in ſtopping the progreſs of the inflammation but local blood letting carried to a conſiderable extent by inciſions made in the affected parts. For this purpoſe the mere diviſion of the turgid veſſels with a lancet or ſmall ſcalpel ſometimes anſwers ; but in general it proves more ſucceſsful to take away ſmall portions from different parts of the internal ſurface of the eye lids with ſmall convex ſciſſars, ſuch as is repreſented in Plate XXXIX. fig. 4. This, Mr. Pellier obſerves, ſeldom fails of giving immediate relief; and he has never afterwards found it produce any inconvenience. The ſtate of the eye too being very critical, no remedy ſhould be omitted that affords any chance of obviating the preſent danger; for if this be not quickly done, ſuppuration will ſoon take place either in the coats of the eye, or in one or both of the chambers.

When matter is evidently formed, a frequent uſe of warm emollient fomentations, applied particularly to the eye by means of a funnel of paſteboard, will ſometimes produce a ſlow diſcharge of it at the inciſion in the cornea: but when this does not ſucceed in the ſpace of eight and forty hours, no more time ſhould be loſt; the matter ſhould be evacuated by an inciſion made in the moſt depending part of the abſceſs, when it is ſeated in the ſubſtance of the cornea; or, by opening the lips of the inciſions made for extracting the cataract, when the collection is in either of the chambers of the eye. By this means the patient will be immediately relieved from pain, while at the ſame time he will receive the only chance of preſerving the uſe of his eye.

There is ſtill another diſagreeable occurrence to which patients are liable during the firſt two or three weeks after this operation; a kind of ſtaphyloma, or herniary ſwelling, formed by the iris, or ſome other part, being forced out at the opening in the cornea, either by violent coughing, ſneezing, or ſome other effort; and in ſome inſtances, by expoſing the eye too ſoon and too frequently before the cicatrix is ſufficiently firm for reſiſting the preſſure thus produced upon it. When the ſwelling which thus takes place is ſmall, it may commonly be removed by touching it frequently with a ſmall pencil dipped in Goulard's extract of lead, concentrated by evaporation, or in any mild antimonial eſcharotic: An attempt, Mr. Pellier obſerves, that may be made with perfect ſafety, if care be taken to prevent the cauſtic from hurting the reſt of the eye, by touching the diſeaſed part only with it, and immerſing the whole eye immediately in warm milk, or in ſome warm emollient decoction. But when the diſeaſe is farther advanced, and if it be of a firm ſolid nature, it anſwers better to remove the protruded part entirely either with the knife or the ſciſſars; or if it appears to be any part of the aqueous humour contained in a thin membranous production, as is ſometimes the caſe, all that is in general neceſſary is, to make an inciſion into it with a lancet of a ſize ſufficient for diſcharging it. It is ſcarcely neceſſary to obſerve, that after either of theſe operations, the parts muſt be treated with much attention, otherwiſe, inſtead of proving ſerviceable, they may do harm. A ſtrict antiplogiſtic regimen muſt be obſerved. The eye ſhould be lightly covered, either with a ſmall bag, ſuch as we have mentioned above, filled with ſoft wool, or with a compreſs of old linen ſoaked in a weak ſolution of ſaccharum Saturni.

Mr. Pellier's method of extracting the cataract, which I have thus endeavoured to deſcribe, with his treatment of the conſequences which ſometimes enſue from it, is the reſult of much experience, and uſually proves more effectual than any other with which we are acquainted. Much of Mr. Pellier's ſucceſs undoubtedly proceeds from his ſuperior dexterity in performing the operation; but much of it alſo depends upon the minute attention he pays to every caſe for a conſiderable time after the operation. In ordinary practice, and eſpecially with the moſt part of itinerants, it is commonly ſuppoſed, if the operation be properly performed, and if the cataract comes away eaſily, that very little more is neceſſary on the part of the operator; but it is much otherwiſe with Mr. Pellier, who conſiders the after treatment as ſo eſſential, that it is with difficulty he is ever prevailed upon to operate where he cannot have the ſubſequent management of the caſe for two or three weeks: And by conſtant and aſſiduous attention, he is often able to obviate ſymptoms which might otherwiſe prove alarming; and which, in many inſtances, might even render operations abortive which would otherwiſe be attended with the moſt complete ſucceſs. Of this I have ſeen different inſtances.

In a former part of this work, I entered into a full diſcuſſion of the reſpective merits of the two operations of couching and extracting the cataract; and I then endeavoured to eſtabliſh the preference of the former: But if experience ſhows, that Mr. Pellier's method of operating is attended with more permanent advantages, I ſhall be very ready to retract my opinion; for which purpoſe, I ſhall carefully attend to the conſequences of thoſe operations which he has performed in this country; and as the public will probably be intereſted in them, I ſhall at ſome future period perhaps communicate the event of them.

There are two points of importance in this operation, with reſpect to which I differ in opinion from Mr. Pellier. When he conſiders it as proper to divide the capſule of the lens, he frequently does it, as we have already obſerved, by inſinuating through the pupil the point of the ſame knife with which he makes the inciſion of the cornea, even before the inciſion is completed.

This may poſſibly be done with ſafety in every inſtance by ſuch a very dexterous operator as Mr. Pellier: but as moſt practitioners, by imitating him, would run the riſk of hurting the iris, the practice ſhould not be encouraged; for when the capſule of the lens is to be divided, it is ſurely better to do it after the inciſion of the cornea is finiſhed, by lifting up the flap, and paſſing in the end of the blunt probe repreſented in Plate XXX. fig. 5. or of the ciſtatome, Plate XL. fig. 3.

The other point to which I allude reſpects the practicability of extracting the capſule of the lens, without doing any material injury to the eye.

When

PLATE XI.

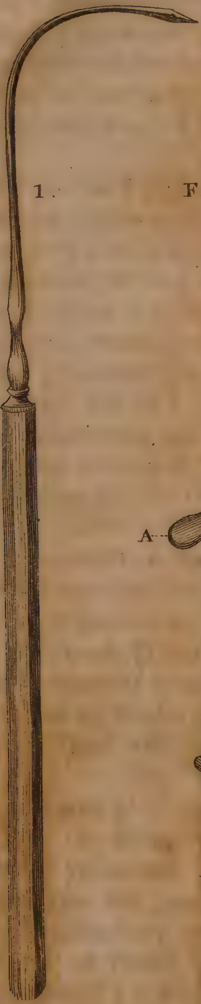


FIG. 1.

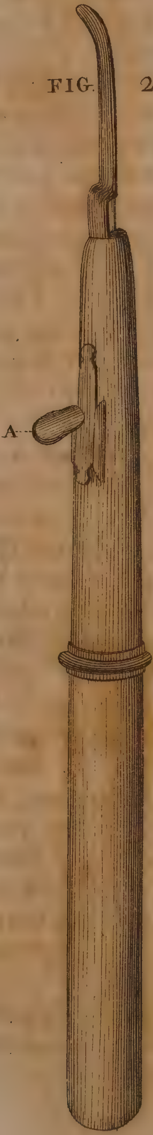


FIG. 2.

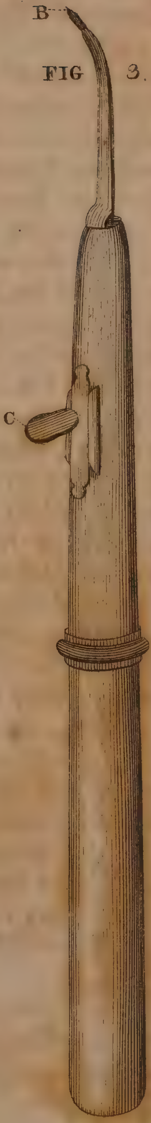


FIG. 3.

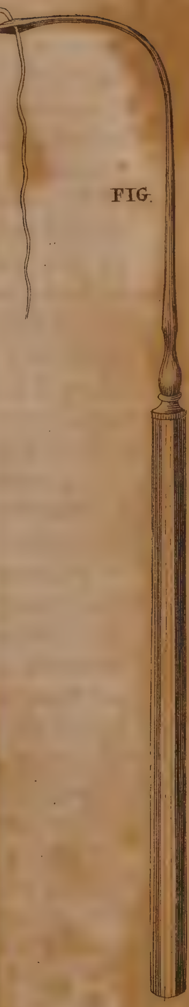


FIG. 4.

When the cataract appears to be of a firm conſiſtence, and when the diſeaſe is ſuppoſed to be confined entirely to the lens itſelf, Mr. Pellier frequently opens the capſule in the manner I have juſt deſcribed, with a view to allow of a more eaſy extraction of the lens; and in this caſe he admits that the capſule remains in the eye: But when he finds, after an operation, that the capſule of the lens becomes opake, or if he obſerves that any part of it has been previouſly in a ſtate of opacity, he adviſes it to be cautiouſly extracted with ſmall forceps: And again, in every caſe where he ſuſpects the cataract to be fluid, forming what he calls the Cyſtic or Hydatid Cataract, he avoids the diviſion of the capſule, and adviſes the lens to be taken out included in it; which he ſays may be done in the manner we have mentioned, by making an equal and gradual preſſure upon the ball of the eye immediately after the diviſion of the cornea; or by ſeparating any adheſions which take place between the capſule of the lens and the contiguous parts, with the curette paſſed through the pupil.

I have not indeed ſeen Mr. Pellier extract the capſule of the lens after removing the lens itſelf; for no caſes requiring it occurred during his reſidence here: I received however full information of his method of doing it, by introducing ſmall forceps at the pupil. But as I cannot imagine how this can be done without injuring the eye materially, I muſt ſtill retain the opinion I formerly advanced of it, till I have evident proofs of its being practiſed with advantage: And whenever theſe are offered, I ſhall receive them with much ſatisfaction, as it would in many inſtances be a material improvement of this operation.

We have now to conſider the poſſibility of extracting the capſule entire along with the lens: Several practitioners in this country had opportunities of ſeeing Mr. Pellier extract cataracts, as they ſuppoſed, in this ſituation. I ſaw him operate in two inſtances of this kind, where he, as well as ſeveral others, imagined that the real capſule was taken out along with the lens; but as I entertain a different opinion on this ſubject, it is proper to ſtate the reaſons which have led me to adopt it.

1. The capſule of the vitreous humour, and that which contains the lens, are ſo intimately connected together, that it is difficult, or perhaps impoſſible, for the beſt anatomiſt to determine whether they are ſeparate productions or not: At leaſt they are ſo intimately connected, that they appear to be formed of the ſame ſubſtance, the cryſtalline lens being ſurrounded with a coat which ſeems to be a thin lamella of that which forms the capſule of the vitreous humour. The contrary, I know, has been alledged; but whoever will make the experiment, will find that the capſule of the lens has exactly the appearance which I have mentioned. It appears to be a production of the other; and they cannot be ſeparated without tearing or deſtroying ſome part of one or both of them: Now, if this is the caſe, when the contents of the eye are all laid open, and when all the aſſiſtance can be got that nice diſſection affords, it appears to me impoſſible that they ſhould be ſeparated in the operation of extracting the cataract without injuring the reſt of the eye, and particularly the vitreous humour, very materially.

2. In performing this part of the operation, viz. in attempting to extract the capſule of the lens entire, Mr. Pellier does it by means which do not appear adequate to the intended effect. He does it, in moſt inſtances, by making a gradual equal preſſure over the ball of the eye, and not by the introduction of forceps. Now it is difficult to conceive in what manner preſſure applied to the eye can ſeparate that intimate connection which certainly takes place between the capſule of the vitreous humour and that of the cryſtalline lens: By preſſure they are frequently both forced out; but no operator would wiſh to meet with this, and no perſon

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perſon guards more effectually againſt it than Mr. Pellier, inſomuch, that the eſcape of the vitreous humour, or even of any part of it, is an occurrence he rarely meets with. In ſome caſes indeed Mr. Pellier inſinuates his curette, as we have already remarked, through the pupil, with a view to detach the capſule of the lens from the contiguous parts: He allows however that this is not always neceſſary; and beſides, there is much cauſe to ſuſpect that the eye would often be hurt by it.

3. When it is found, as we have already obſerved, either during the operation of extracting the cataract, or afterwards, that the capſule of the lens is opake, even Mr. Pellier himſelf does not attempt to extract it by preſſure. In this caſe he does it with forceps paſſed through the pupil. Now, if preſſure anſwers in one variety of the diſeaſe, it ought probably to do ſo in others, ſo that the uſe of forceps ſhould not be neceſſary; but it is only in the hydatid or ſoft cataract which Mr. Pellier allows that this practice by preſſure ſucceeds.

4. But as ſeveral practitioners, both here and elſewhere, have ſeen Mr. Pellier extract the cataract, ſurrounded, as they imagined, with its proper capſule; and as he aſſerts with confidence, that it may be done merely by preſſure; it will be aſked, In what manner is this apparent contradiction to be explained? I can account for it only on the ſuppoſition of there being in all ſuch caſes, where this practice of extracting the capſule entire is conſidered as admiſſible, a preternatural formation of a new membrane within the capſule of the lens; which being of a firmer nature than the capſule itſelf, and probably very little, if at all, attached to the contiguous parts, we can eaſily ſee how it may be forced out entire, even by moderate preſſure, and how eaſily byſtanders may be deceived with it. When I firſt ſaw it done by Mr. Pellier, as I had previouſly been informed that the whole capſule would be extracted along with the lens; as I had

heard from very reſpectable authority that he had done it in different inſtances at Glaſgow; and as I certainly ſaw the cryſtalline puſhed out, ſurrounded with a membranous bag, I muſt own that I was nearly converted to Mr. Pellier's opinion: But on further conſideration, the reaſons I have mentioned againſt it appeared too concluſive, even for this weight of evidence to remove; and ſince that period, a circumſtance has occurred, which with me puts the matter beyond a doubt. A cataract of a ſoft nature was extracted by Mr. Pellier, ſurrounded with this membrane or bag quite entire. From the firſt I doubted much of its being the proper capſule of the lens, as it was ſaid to be: for this tunic is well known to be exceedingly fine and delicate; whereas this was a membrane of a tolerable degree of firmneſs, which required ſome force to tear it. The patient however diſtinguiſhed objects immediately after the operation; and what was then advanced concerning it, could not be well refuted: But by ſome cauſe or other, poſſibly from the eye becoming inflamed, an opacity ſoon began to form in the old ſite of the chryſtalline, directly behind the pupil, forming, to all appearance, a real cataract; and it now continues even after the inflammation is removed. Whatever explanation may be given of this by thoſe who are inclined to ſupport the contrary opinion, it proves to me a convincing proof, that ſome deception takes place in thoſe caſes where it is ſuppoſed the capſule is extracted entire along with the lens; for in this caſe, where the capſule was imagined to be taken entirely out, the opacity which ſucceeded, and which ſtill exiſts, appears evidently to be ſeated in the capſule, and no where elſe. I therefore conclude, where practitioners have imagined the capſule has been extracted entire, that they have been deceived by the lens being enveloped with a preternatural bag or cyſt, formed, perhaps, by an inflammatory exſudation from the internal ſurface of the capſule: That this production however, is always formed in this manner, I will not poſitively aſſert;

ſert; but in my opinion it is the moſt probable way by which we can account for it.

In this variety of cataract, however, it is certainly right to attempt the extraction of this membrane, for viſion will not be perfect while it continues in the eye. But if I may venture to diſſent from the opinion of one ſo verſant in matters of this kind as Mr. Pellier is, I would obſerve, that we ſhould not, even in the moſt fluid cataract, endeavour to extract it without opening the capſule ſo as to diſcharge the contents of it: for as the cyſt of which we have been ſpeaking does not appear to be firmly attached to the neighbouring parts, it is probable it would be ſeparated from them with as much eaſe when quite empty as when perfectly full, and it would in this ſtate paſs through the pupil with much leſs riſk of hurting the iris; an object which we have elſewhere endeavoured to ſhow, is perhaps the moſt important of any in this operation.

Theſe are the remarks I have to offer on Mr. Pellier's theory and practice in the cataract. If farther obſervation ſhall convince me that I am wrong, I will readily acknowledge my miſtake; but in the mean time, the reaſons I have adduced appear to evince the impropriety of extracting the capſule piecemeal by means of forceps paſſed through the pupil, as well as the impoſſibility of making it paſs entire along with the lens.

Mr. Pellier's practice, as we have already obſerved, is not confined to the treatment of the cataract. He is equally accuſtomed to the management of every other diſeaſe to which the eyes are liable. In all of them he has acquired much uſeful experience; but we ſhall confine our account of his practice to thoſe points in which his improvements appear to be of moſt importance.

In the treatment of ophthalmia or inflammation of the eyes, whatever may be the cauſe of the diſeaſe, he condemns the uſe of emollients, and truſts entirely to remedies of an oppoſite nature. When the inflammation is violent, is of long duration, and does not yield to the uſual means employed for it, he recommends a free diviſion of the turgid veſſels on the adnata; and in order to do the operation effectually, he carries an inciſion round the whole globe of the eye, on that part of it where it appears to be moſt inflamed. The curved ſharp pointed knife, Plate XLI. fig. 5. he recommends as the beſt inſtrument for this operation. But with thoſe not much accuſtomed to it, I believe it will be eaſier done with the knife delineated in Plate XXXI. fig. 3.*

The ſcarifications being completed, the eye ſhould be immediately bathed in warm milk and water, in order to promote as much as poſſible a free diſcharge of blood: and this being done, he adviſes a little of the following ointment to be introduced on the end of a blunt probe between the eyelids, to be repeated once or twice daily as long as the diſeaſe may continue, at the ſame time that a weak ſaturnine ſolution is employed morning and evening as a waſh.

℞. Mercur. precip. rubr.	
Lapid. calamin. pp^{tt}.	āā ʒiſs.
Lythargyrii pp^{tt}. -	ʒi.
Tutiæ pp^{tt}. -	ʒſs.
Cinnab. nativ. -	℈i.

F. pulv. tenuiſſim. et miſce cum axungiæ porcinæ ℥ii. et adde balſam. Peruviani gutt. xv.

This ointment Mr. Pellier makes uſe of with much freedom and advantage in all diſeaſes of the eyes that have either been induced by inflammation, or that happen to be attended with it; and he finds it particularly uſeful in thoſe caſes of Albugo or Leucoma where corroſive applications are admiſſible.

It ſometimes happens in the ſmall pox, as well as in ſevere inflammatory affections of the eye, from whatever cauſe they may originate, that the centre of the cornea is left in a ſtate of opacity, by matter forming between

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* I was clearly of this opinion when the firſt edition of this volume went to the preſs; but having of late made trial of Mr. Pellier's inſtrument in ſeveral caſes, I muſt do him the juſtice of acknowledging that it anſwers better than any other I have ever uſed.

PLATE XLI.

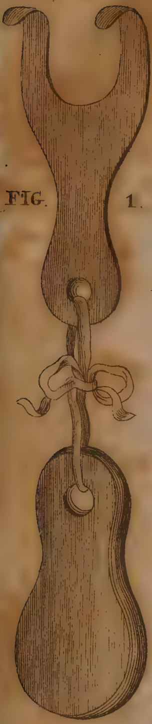
FIG. 1.

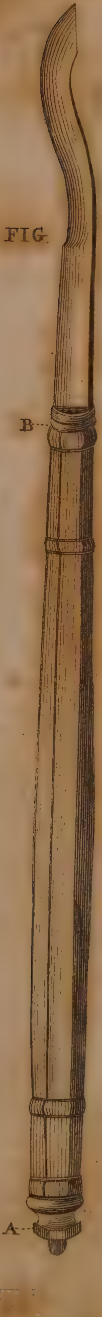

FIG. 2.

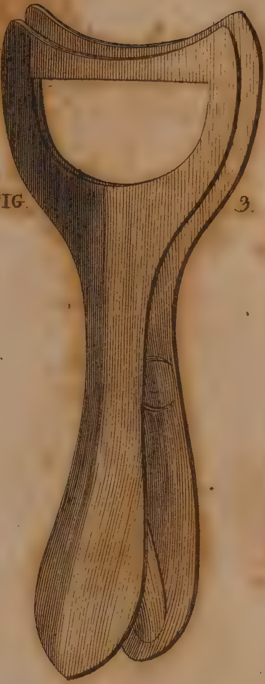
FIG. 3.

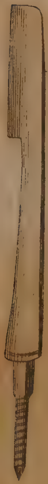
FIG. 4.

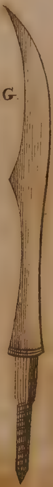
FIG. 5.

between the coats of it. When this is not carried off by the remedies uſually employed, if the iris, retina, and other parts of the eye appear to be ſound, Mr. Pellier adviſes an operation, from which he has in different inſtances derived much advantage. The centre of the cornea being opake, the rays of light are thus prevented from paſſing to the bottom of the eye through the pupil; but when the ſides or external border of the tranſparent cornea ſtill remain clear and ſound, light may be allowed to paſs to the retina by enlarging the pupil; which, Mr. Pellier ſays, may be done with ſafety by making an inciſion from one ſide of the iris to the other. And his method of doing it is this: He firſt makes an inciſion in the prominent part of the cornea, in the ſame manner as for extracting the cataract: He then inſerts a ſmall grooved director beneath the flap of the cornea through the pupil; and having paſſed it in a horizontal direction immediately behind the iris towards the outer angle of the eye, he now takes a pair of ſmall curved ſciſſors, and paſſing one of their blades along the groove of the director, he at once divides this part of the iris, when he withdraws the inſtruments and makes a ſimilar inciſion on the oppoſite ſide of the eye. By this means, when the opacity is confined to the centre of the cornea, which is frequently the caſe, the rays of light which paſs through the ſides of it will now get acceſs to the bottom of the eye, by the pupil being extended from one ſide of the iris to the other: and thus a degree of viſion will be produced which could not otherwiſe be obtained. It will readily be imagined that perfect viſion is not to be expected in this ſtate of the eye; for a variety of reaſons concur againſt it: but it is a matter of much importance for a perſon already totally blind to be rendered capable of finding his way, and of conducting himſelf from one place to another; which by this operation Mr. Pellier has done in different inſtances: and, ſo far as I know, the public are indebted to him alone for propoſing it.

After the operation, the eye muſt be tied up, and treated in the ſame manner and with the ſame attention as is done after the extraction of the cataract; for where ſo much violence is done to the eye, if inflammation be not guarded againſt, much miſchief may occur from it.

In deſcribing the method of dividing the iris, we have ſaid that it ſhould be done with the ſciſſors; for this membrane being looſe and unſupported, it would yield before the edge of the ſharpeſt knife. In the introduction of the director and ſciſſors, care ſhould be taken, in paſſing them between the iris and lens, not to injure either the lens or its capſule; that is when the diſeaſe is not complicated with a cataract; for when the cryſtalline is opake it ſhould be extracted.

In the treatment of the fiſtula lachrymalis, Mr. Pellier has much merit; for, with moſt operators, it ſeldom happens that any permanent advantage is obtained from any of the remedies employed in it, and even they who are much accuſtomed to the management of it often fail entirely. Mr. Pellier does not ſay that he always ſucceeds; but he does ſo in moſt inſtances; and I know that his method has often proved ſucceſsful where others have failed.

In a confirmed fiſtula lachrymalis, the curvative intention is, to form an opening between the lachrymal ſac and the correſponding noſtril. There are different methods of effecting this: By ſearching with a blunt probe, to diſcover the natural paſſage: If this fails, by making an artificial opening through the os unguis: and when neither of theſe ſucceed, by leaving a tube or canula, either in the natural or artificial opening, for the purpoſe of conducting the tears to the noſe.

As we know from experience, that the operation fails in various inſtances, from the paſſage becoming again impervious, and this whether it may have been done by opening the natural paſſage or by forming another, it would be the idea perhaps of moſt practitioners

PLATE XLII

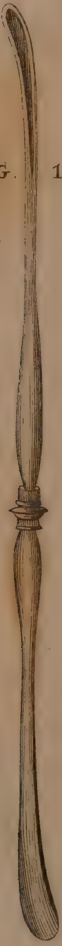
FIG. 1.

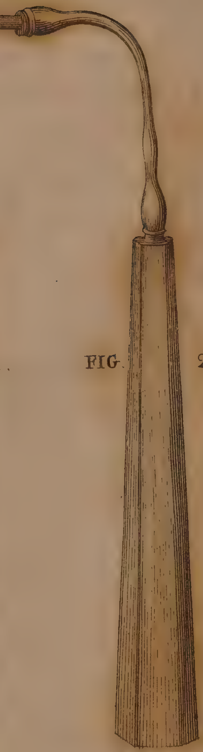
FIG. 2.

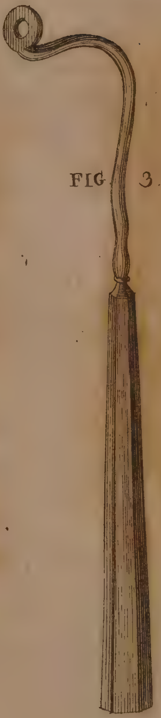
FIG. 3.

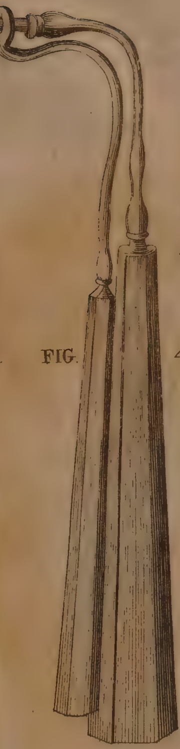
FIG. 4.

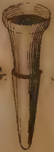
FIG. 5.

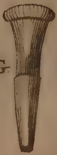
FIG. 6.

tioners to leave a tube in the opening, were it not liable to one very material objection, namely, the uncertainty of its continuing fixed in its ſituation : for hitherto we have not been poſſeſſed of any certain method of preventing the canula either from riſing and forcing its way out at the corner of the eye, or from paſſing down and coming out at the noſe. In Plate XXXVII. I have already delineated various forms of tubes which have been uſed for this purpoſe ; and of theſe, figures 3. and 10. will in moſt caſes, I believe, be found to anſwer : for when they are preſſed ſufficiently into the opening through the os unguis, the bulge or prominence with which they are furniſhed above, will for the moſt part prevent them from riſing, while their conical ſhape will prevent them from paſſing into the noſe. I muſt, however, acknowledge, that they ſometimes fail ; and that an invention of Mr. Pellier's appears to be much ſuperior to them. I know one inſtance in which it has hitherto anſwered completely, and many months have elapſed ſince the operation.* From the form of the tube, there is much reaſon to imagine it will anſwer ; and Mr. Pellier aſſerts, that when it is properly introduced it never fails. Two repreſentations of it are given in Plate XLII. figures 5. and 6. It may be made either of gold or lead. Mr. Pellier commonly employs lead : but when made of gold, the tube will not be ſo bulky if of the ſame ſtrength ; and as this metal receives a finer poliſh, by which the opening through it will not ſo readily fill up with the tears, it ought, I think, to be preferred.

The peculiarity of form of Mr. Pellier's tubes conſiſts in their having two projecting edges ; one at the top, forming a kind of brim, correſponding as nearly as poſſible to the ſize of the lachrymal ſac ; and the other near to the middle between this and the other end of the inſtrument ; by which means, when it is properly fixed in the paſſage where it is to remain, it is kept firm in its ſituation by the granulations which ſhoot out from the contiguous parts; and which, by graſping as it were that part of the tube which lies between the two edges, effectually prevent it from paſſing either upwards or downwards; and hence that material inconvenience is avoided which practitioners who employ cylindrical tubes always complain of.

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* It is now eighteen months ſince this operation was performed : The tube ſtill continues fixed in its ſituation ; it is not productive of any kind of uneaſineſs ; and the cure is complete.

It is neceſſary, however, to obſerve, that the utmoſt nicety is required in the uſe either of theſe, or indeed of any other tubes; in the firſt place, in adapting them with exactneſs to the ſize of the openings through which they are to paſs; and afterwards in the introducing them a proper length into the noſe: For if a tube be either too ſmall or too large for the opening through the os unguis, we may readily imagine that it will not anſwer; and if it be preſſed even a very little too far into the noſtril, it will neceſſarily irritate the lining membrane of that cavity, ſo as to create much pain and inconvenience. The tubes repreſented in Plate XLII. are of a ſize both in length and thickneſs which anſwer for the moſt part of adults, but practitioners ſhould be provided with them of various ſizes.

The method of uſing them is this. After laying the lachrymal ſac freely open in the uſual way, the natural conduit of the tears is ſearched for, either with a firm probe, or with the conductor, Plate XLII. fig. 2. and Mr. Pellier aſſerts that he never fails in finding it. As ſoon as this is diſcovered, the tube muſt be put upon the conductor, previouſly furniſhed with the compreſſor, fig. 3. as in fig. 4. and it ſhould be of ſuch a ſize that the conductor may fit it exactly in point of thickneſs, while the end of this inſtrument is ſo much longer as to paſs through it about the tenth part of an inch. The point of the conductor is now to be inſinuated into the lachrymal duct; and being puſhed in till it reaches the noſtril, which may be known either by inſerting a probe into it, or by a few drops of blood being obſerved to fall from the noſe, the conductor being no longer neceſſary, muſt be withdrawn, taking care to leave the compreſſor upon the upper brim or edge of the canula; which muſt be firmly preſſed down with it in the left hand, while the conductor is removed with the other. If this precaution be not attended to, the canula would be brought out along with the conductor; but this inconvenience is in this manner very effectually prevented, while the ſame inſtrument ſerves more eaſily than any other to preſs the canula to a ſufficient depth in the lachrymal duct: a point of the firſt importance in the performing of this operation; for if the canula be not fixed with ſome degree of firmneſs even at the firſt attempt, there will afterwards be more pain and difficulty in doing it.

This being done, the compreſſor muſt next be taken out; and, with a view to diſcover whether the canula is at a proper depth or not, a little milk and water ſhould be injected through it with the ſyringe, Plate XXXVII. fig. 1. If the injection paſſes freely and eaſily into the noſtril, while the upper part of the canula is preſſed down to the middle of the lachrymal ſac, there will be no reaſon to doubt of its being properly placed: If, on the contrary, any obſtruction occurs, there will be reaſon to ſuſpect that it is already puſhed too far, and that it preſſes againſt the os ſpongioſum inferius; in which caſe the canula ſhould be withdrawn, with a view to ſhorten it, when it muſt be again introduced in the manner we have mentioned.

As the wound recently made in the ſac will yield a conſiderable quantity of matter, it is neceſſary to preſerve it open for eight or ten days with a bit of ſoft lint ſpread with any emollient ointment, taking care to cover the whole with a compreſs of ſoft old linen, ſecured with a proper bandage. An injection of milk and water ſhould be daily paſſed through the canula; and at the end of this time, or whenever the ſuppuration is much diminiſhed, and the ſore looking clean and healthy, the doſſil of lint muſt be entirely removed; and a piece of court plaſter being laid over the ſore, it may in this ſtate be left to heal, care being taken to renew the plaſter if any matter appears to form beneath it.

By this mode of treatment, caſes of fiſtula lachrymalis, that do not depend upon diſeaſed contiguous bones, or any latent diſeaſe of the conſtitution, will for the moſt part, as Mr. Pellier obſerves, be completely cured in three weeks, nay ſometimes in a fortnight, which by the uſual practice might require three, four, or five months.

As I have been witneſs of the moſt complete ſucceſs of Mr. Pellier's practice in this diſeaſe, I have conſidered it as a point of juſtice, not only to Mr. Pellier, but to the public, to give this full detail of it. Indeed, if I had not been convinced of the ſuperior utility of Mr. Pellier's practice, and of the unreſerved manner in which he communicated his knowledge of the diſeaſes of the eyes, I ſhould have deemed it impertinent to have given the preceding account of either to the public.

Since the firſt edition of this volume was publiſhed, the opinion which I then ſuggeſted, of the impoſſibility of extracting the capſule of the lens entire, has been the ſubject of much inveſtigation: And as it now appears that it cannot be done, I ſtill conclude, that Mr. Pellier, and others who adopted a different opinion, have been deceived.

CHAPTER XXVIII.

Of the DISEASES *of the* NOSE *and* FAUCES.

SECTION I.

Anatomical Deſcription of the NOSE *and* FAUCES.

A MINUTE deſcription of theſe parts is not neceſſary for our purpoſe; but a few remarks upon their general form and ſtructure may ſerve in ſome meaſure to elucidate the nature of thoſe diſeaſes to which they are liable.

The external prominent part of the noſe is chiefly compoſed of bones and cartilages, which ſerve to protect the more deep ſeated parts of the organ of ſmell, and to form a kind of vaulted paſſage for the air to the throat.

This paſſage, divided by the ſeptum naſi, forms the noſtrils, which extend almoſt in a horizontal direction from the ſuperior part of the upper lip backwards to the pharynx, where they terminate above the velum pendulum palati.

The ſuperior and lateral parts of the arch of the noſe are formed by the naſal proceſs of the os frontis—by the two oſſa naſi—by the oſſa unguis—and by an extenſive proceſs from each of the oſſa maxillaria, to which the cartilaginous alæ of the noſe, covered by the common teguments, are immediately attached.

The ſeptum narium is formed by the naſal proceſs of the ethmoid bone—by the vomer—by the middle cartilage of the noſe—and by the ſpinous proceſſes of the palate and maxillary bones.

The under part of the cavity of the noſe is anteriorly bounded by a horizontal proceſs of the oſſa maxillaria, and backwards by a proceſs of a ſimilar form, from each of the oſſa palati. The ſphenoid and ethmoid bones form the boundaries of the poſterior part of the nares.

Towards the upper part of the noſe, we meet with a very beautiful contrivance of nature for enlarging the organ of ſmell. In the ſuperior part of each noſtril, oppoſite to the ſeptum, we find a ſpongy, cellular production of bone, proceeding from the os ethmoides, which, from their form, texture, and ſituation, are termed Conchæ, Oſſa Spongioſa, or Oſſa Turbinata Superiora: And beneath theſe, on the ſame ſide of the noſtrils, are two bodies of a ſimilar texture, which have likewiſe been ſuppoſed to be productions of the ethmoid bone, but of which there is no evidence. Theſe, from their ſituation, are termed Oſſa Spongioſa Inferiora. In ſome inſtances, two, and even three, ſmall bones of this kind have been met with in each noſtril; but this is not a frequent occurrence.

Theſe bodies being prominent, and even ſomewhat irregular on their ſurfaces, give the noſtrils a winding, or even a crooked appearance: but every practitioner will know that they are ſo in appearance only; inſomuch that a common probe may be paſſed almoſt in a ſtraight line from the external nares to the throat.

We meet with ſeveral openings which terminate in the noſtrils, ſome of which it is material for ſurgeons to be acquainted with; viz. The ductus inciſorii, which commence at the under and back part of the noſtrils, and terminate behind the dentes inciſivi of the upper jaw; the ſinuſes of the ſphenoid and frontal bones, which both open into the upper part of the nares;—the ſinus of each maxillary bone, commonly termed the Antrum Maxillare, or Highmorianum, which opens into the noſe between the upper and under oſſa ſpongioſa of the ſame ſide; and laſtly, the ducts of the lachrymal ſacs, which we have formerly had occaſion to deſcribe, and which terminate on each ſide immediately beneath the os ſpongioſum inferius.

All the cavity of the noſtrils; the different ſinuſes we have mentioned, as well as the paſſages leading to them; the whole ſurfaces of the oſſa ſpongioſa, and even the fauces, are covered or lined with a thick, ſoft membrane, which, from its affording a plentiful ſecretion of mucus, is commonly termed Membrana Pituitaria, or Membrana Schneideri, from Schneider, the firſt anatomiſt who gave an accurate deſcription of it.

This membrane appears to be a continuation of the cuticle. Towards the external nares, near to its connection with the epidermis, it is exceedingly thin; but as it proceeds backward upon the ſeptum naſi and on the oſſa ſpongioſa, it acquires a conſiderable degree of thickneſs; and again becomes thin as it proceeds to line the different ſinuſes.

The cavity of the noſe, as we have already remarked, is ſeparated from the mouth by a plate of bone, formed by a proceſs from each of the oſſa maxillaria, and by the oſſa palati. To the poſterior edge of the laſt mentioned bone there is a firm membrane connected, termed the Velum or Valvula Palati, formed by a junction of the common membrane of the mouth, with a continuation of the membrana Schneideri, together with ſeveral muſcular faſciculi, intended for the motion of this and the contiguous parts. This membrane, as it ſtretches back from the palate, falls down and terminates in the uvula immediately above the root of the tongue; by which it is not only well fitted for preventing the food, during maſtication and deglutition from paſſing up to the noſe, but for conveying backwards to the pharynx all ſuch parts of the mucus furniſhed by the membrane of the noſe and contiguous ſinuſes as are not diſcharged by the external nares.

On each ſide of the throat, at the termination of the velum pendulum palati, there is ſituated a prominent glandular ſubſtance commonly termed the Amygdalæ or Almonds of the Ear. They are naturally of a ſoft, yielding texture; and in general they have excavations of different degrees of deepneſs on various parts of them, which, by thoſe not acquainted with the uſual appearance of theſe parts, are often miſtaken for ulcerations. On looking farther into the throat, along the courſe of the tongue, a thin, elaſtic, cartilaginous body is obſerved, termed Epiglottis, which is ſo placed as to prevent the food from falling into the trachea in its paſſage from the mouth to the pharynx, a wide capacious bag, which terminates in the œſophagus, and occupies all that part of the throat which is ſeen on looking into the mouth.

From this deſcription it is evident, that the pharynx is furniſhed with ſeveral openings or outlets. Below, it terminates in the œſophagus;—anteriorly, it communicates directly with the mouth;—and from the ſuperior part of the bag it has a free direct communication with the poſterior openings of the noſtrils.

We ſhall now proceed to conſider the diſeaſes of the parts which we have deſcribed, and the operations which are practiſed in the treatment of them. The ſubjects to be treated of are, Hemorrhagies from the Noſtrils—Ozæna—Imperforated Noſtrils—Polypous Excreſcences in the Noſe and Throat—Extirpation of the Amygdalæ and Uvula—and Scarifying and Fomenting the Throat.

SECTION II.

Of HEMORRHAGIES *from the* NOSTRILS.

THE internal parts of the noſe are ſupplied almoſt entirely with blood from the internal maxillary artery: And, in general, the branches of this artery which go to the noſe are ſo extremely ſmall, as to render a diviſion or rupture of any of them an object of little importance. In ſome inſtances, however, the reverſe of this takes place, and hemorrhagies occur from theſe parts which prove highly embarraſſing to practitioners, and very hazardous to patients. They have ſometimes even baffled every attempt that could be made to reſtrain them. However trifling, therefore, this evacuation may for the moſt part appear, it ought always to be treated with attention.

In a great proportion of caſes, a proper application of cold puts a temporary ſtoppage to the diſcharge; and in general, any future returns of it may be prevented by blood letting, by a moderate uſe of cooling laxatives, and a low regimen.

In order to obtain all the advantages that may be derived from the application of cold, it muſt be employed in various ways, and to a conſiderable extent. The patient ſhould be placed in a large apartment, with a current of cold air paſſing through it: His food and drink ought all to be cold: His face ſhould be frequently bathed, and even immerſed, in cold water, or in cold water with a proportion of vinegar: A ſtrong ſolution of alum, or of any other aſtringent, ſhould be uſed from time to time as a gargle: Compreſſes wet in any liquid of this kind ſhould be applied over the noſe: When in bed, he ſhould be very lightly covered; and he ſhould ſleep with his head as high as poſſible.

By theſe means duly perſiſted in, naſal hemorrhagies may in general be removed; but in ſome inſtances no advantage whatever is derived from them, and the flow of blood is not in any degree diminiſhed by the moſt exact application of them.

In ſuch caſes, compreſſion of the ruptured blood veſſel is alone to be depended on; but when the part affected is deeply ſeated in the noſtril, the application of preſſure is both difficult and uncertain. It will ſometimes happen that a doſſil of lint introduced into the bleeding noſtril will put an immediate ſtop to the diſcharge. This, however, is a rare occurrence; for the extent and diameter of the paſſage through which the doſſil muſt be puſhed being very unequal, the effect produced by it muſt likewiſe be ſo: From this circumſtance, we cannot place much dependence on this method of applying preſſure.

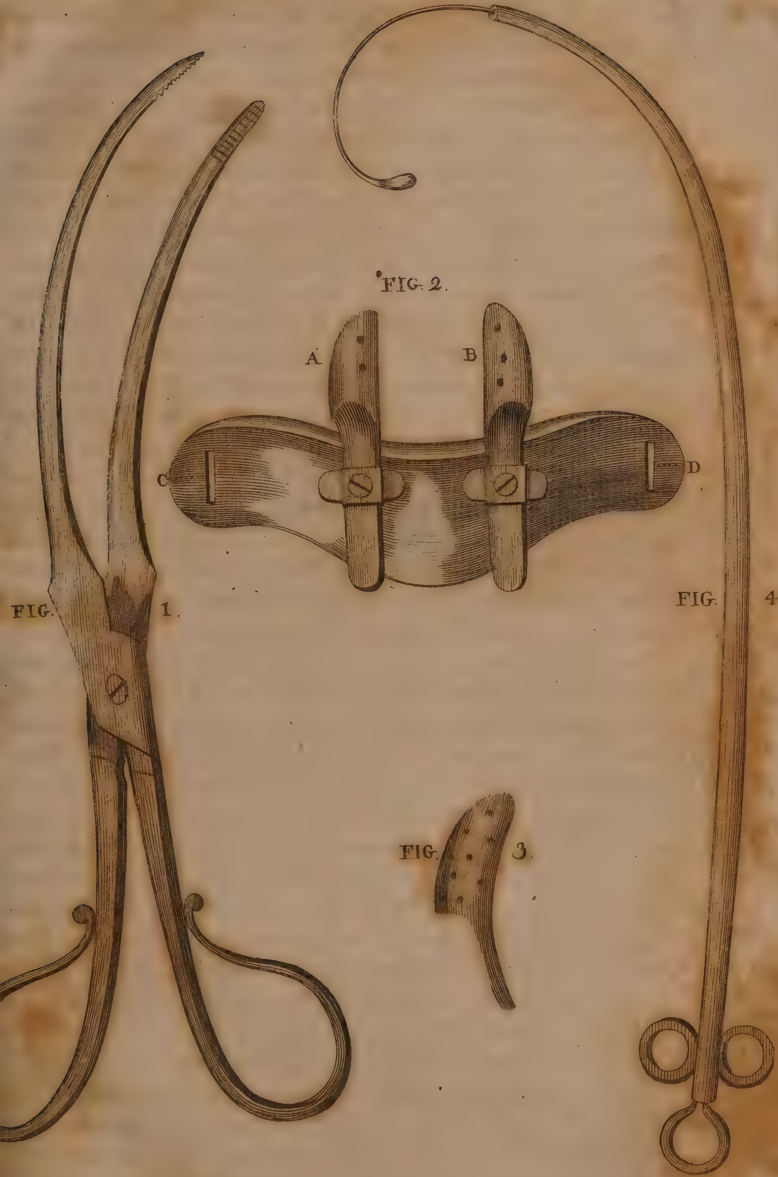
In a former part of this work, when treating of evacuations of blood from the anus in caſes of piles, we adviſed the application of preſſure, by the introduction of a piece of gut, tied at one end, into the rectum, and by filling it at the oppoſite extremity with any cold liquid, to increaſe the degree of preſſure by forcing up the liquid and ſecuring it with a ligature. The ſame remedy may be employed in hemorrhagies from the noſe. It has already been ſucceſsfully made uſe of in a few inſtances; and may frequently, we think, be employed with advantage. A piece of hog's gut, that has been previouſly dried and moiſtened again, anſwers beſt. One end of it firmly tied with a bit of ſmall packthread, ſhould, by means of a probe or director, be puſhed along the whole courſe of the noſtril from which the blood is diſcharged, to the upper end of the pharynx. The gut ſhould now be filled with cold vinegar, water, or any other cold liquid, by means of a ſyringe inſerted at the end hanging out at the noſtril; and as much being injected as the gut will admit, the whole ſhould be preſſed as far up as poſſible, and ſhould be ſecured in this ſituation by a firm ligature.

In this manner a very conſiderable degree of preſſure may be applied; and ſome advantage may be derived from the application of cold directly to the veſſel from whence the blood is diſcharged. In ſome inſtances, however, even this may be found to fail, owing to the ruptured veſſel being ſo ſituated that preſſure cannot in this manner be applied to it. In ſuch circumſtances, we muſt attempt by other means to put a ſtop to the hemorrhagy; and it may commonly be done in the following manner.

Let the curved inſtrument, fig. 4. Plate XLIII. be inſerted at one of the noſtrils with a piece of catgut or firm waxed thread contained in it; and being conveyed into the throat, the ligature muſt be laid hold

of

PLATE XLIII.



of with a pair of forceps, and taken out at the mouth, when the inſtrument is to be withdrawn and again introduced at the other noſtril with a ligature of the ſame kind. A bolſter of ſoft lint, of a ſufficient ſize for ſtuffing or filling up the poſterior nares, is now to be firmly tied to the two ends of the ligatures hanging out at the mouth, when the oppoſite ends of them muſt be pulled forward at the noſtrils till the cuſhion of lint is firmly applied to and fixed in the upper part of the pharynx; when a compreſs of lint muſt be applied to each noſtril, and fixed in this ſituation by tying the two ligatures over it. The patient ſhould now be laid to reſt. If the bolſters of lint have been properly applied, no blood will eſcape either from the poſterior or anterior nares; any blood that is effuſed into the noſtrils will ſoon coagulate, and thus a ſtop will be put to the hemorrhagy. It is evident, however, that in order to inſure ſucceſs to this operation, the bolſters of lint ſhould not only be applied with much exactneſs, but ought to be continued for a length of time ſufficient for admitting of the healing or reunion of the ruptured blood veſſels.

In fixing the bolſter of lint in the back part of the mouth, we have adviſed two ligatures to be employed; one to be paſſed through each noſtril. In this manner it may be applied not only more firmly, but more equally, than by the uſual method of only one ligature paſſed through that noſtril from whence the blood is diſcharged.

SECTION III.

Of an OZÆNA.

THE term Ozæna has in general been applied to ſuch ulcers of the noſe as are foul, that diſcharge a fetid matter, and that are attended with a carious ſtate of one or more of the bones; whilſt by ſome the ſame general denomination of ozæna is applied to every ulcer in the noſtrils, whether attended with a caries or not. At preſent we ſhall adhere to this laſt acceptation of the term.

Every catarrh affecting the lining membrane of the noſe, is attended in a greater or leſſer degree with an inflamed ſtate of the parts immediately diſeaſed. But we know, that in general this terminates eaſily, and that the inflammation is removed by a plentiful diſcharge either of mucus or of a thick yellow matter. In ſome inſtances, however, even after every other catarrhal ſymptom is removed, this diſcharge of matter continues obſtinate, either from ulceration alone, or perhaps from ulceration conjoined with fulneſs and ſwelling of the lining membrane of the noſe.

Expoſure to cold is to be conſidered as the moſt frequent cauſe of this ſtate of the diſeaſe; but external violence of every kind that terminates in an inflamed ſtate of the membrane of the noſe, ſuch as the application of acrid irritating ſubſtances, blows and bruiſes, &c. may likewiſe be productive of it.

When the ſyſtem is not affected with any other diſeaſe, this is the moſt ſimple variety of an ozæna; and as in this ſtate we ſuppoſe the affection to be perfectly local, local remedies ought alone to be recommended.

In this ſtate of the diſeaſe, applications of a moderately drying and aſtringent nature are chiefly to be depended on. Of theſe, decoctions of walnut tree leaves, of Peruvian or oak bark, mixed with a ſolution of alum, and all the ſaturnine ſolutions, are perhaps equal if not preferable to any. Brandy or any other ardent ſpirits diluted with water, and lime water, may likewiſe be employed with advantage.

Doſſils of ſoft lint ſoaked in any of theſe ſhould be introduced into the affected noſtril three or four times daily, and ſhould be puſhed up as far as may be neceſſary for coming into contact with the affected parts; and every night at bed time an ointment ſhould be applied, prepared with a conſiderable proportion of calcined zinc or of lapis calaminaris.

By a due continuation of theſe means, every local affection depending on ulceration of the membrane of the noſe will be at laſt removed. But inſtances have occurred of other diſeaſes being miſtaken for ſores in the noſe, and of the running produced by them continuing to reſiſt every effort that could be made for its removal. This is particularly the caſe with collections of matter in the antrum maxillare.

In the anatomical deſcription we have given of theſe parts, we have ſeen, that there is naturally a paſſage or opening from the antrum maxillare into the noſe immediately below and covered by the os ſpongioſum inferius of the ſame ſide. In collections of matter in this cavity, when in conſiderable quantity, it is occaſionally diſcharged by this outlet into the noſe in every poſture of the body, and almoſt always when the patient lies on the ſound or oppoſite ſide, if the paſſage be not obſtructed. The method of treatment beſt ſuited for the removal of collections in the antrum maxillare will be the ſubject of a ſection in the enſuing chapter: At preſent we have only to ſay, that in the treatment of diſeaſes attended with a diſcharge of matter from the noſe, practitioners ought to be on their guard, leſt, by miſtaking one diſeaſe for another, miſchief may be done; not only by a miſapplication of remedies, but by thoſe means being omitted from whence alone any real advantage could be derived.

When, again, the matter diſcharged from an ulcer in the noſe is thin, fetid, and of a brown or ſomewhat black colour, as there will be much cauſe to ſuſpect from this that the contiguous bones are carious, it will be in vain to expect a cure till theſe are removed. We may in general be certain of the exiſtence of caries merely by the peculiar fetor of the matter which ſuch ſores afford; but when any doubt remains of this, we have it commonly in our power to be determined with certainty by the introduction of a probe.

As a carious ſtate of the bones of the noſe occurs more frequently as a ſymptom of lues venerea, than from any other cauſe, this ought to be kept in view in every affection of this nature: And whether we may be able to trace it with certainty as a ſymptom of this diſeaſe or not, whenever there is the leaſt cauſe for ſuſpicion, the patient ought, without heſitation, to be put upon a long continued courſe of mercury. Indeed, from whatever cauſe the diſorder may ariſe, mercury will not probably do harm; and as I have ſeen it prove ſerviceable even where there was no cauſe to ſuſpect a venereal taint, I now in general make it a rule, in all ſuch caſes, to adviſe it immediately.

In the mean time the local treatment of the ſores ſhould be particularly attended to. The parts ſhould be bathed from time to time with one or other of the decoctions already mentioned; and as the ſoft ſpongy bones of the noſe are apt, when carious, to produce troubleſome fungous excreſcences, ointments, impregnated with corroſive applications, ſhould be employed occaſionally; and of theſe there are none I have ever tried that anſwer ſo well as prepared verdegris or red precipitate. There is a general prejudice indeed againſt the uſe of remedies of this kind in diſeaſes of the internal parts of the noſe, from a fear of their doing miſchief, by irritating the very ſenſible membrane to which they are applied. There is no good cauſe, however, for this timidity; and I can ſay from experience, that ointments, ſuch as I have mentioned, of a ſtrength ſufficient for keeping down the moſt part of fungous excreſcences, may be employed with much ſafety, and without any riſk of injuring the contiguous parts. It is ſcarcely neceſſary to remark, that in the uſe of remedies of this kind, ſome prudence and attention is required to adapt the ſtrength of them to the parts to which they are to be applied. The internal ſurface of the noſe will not bear the ſame degree of irritation that may with ſafety be applied to ſome other parts of the body; but it will bear the application of corroſive ointments more ſtrongly impregnated than is commonly imagined. A liniment compoſed of wax and oil, with an eighth or ninth part of red precipitate, or a ſmaller proportion of verdegris, may in general be employed with perfect ſafety, and the corroſive powers of it can be occaſionally increaſed or diminiſhed. The growth of fungous excreſcences being thus prevented, and the ſores being kept clean by the frequent uſe of an aſtringent antiſeptic waſh, the paſſage of the noſtril will be preſerved pervious, the diſorder will not ſpread ſo readily, and at the ſame time the diſeaſed bones will probably be more quickly ſeparated and thrown off than when theſe circumſtances are not duly attended to.

Till the caries is removed, no permanent cure can be expected. The treatment therefore which we have juſt recommended ſhould be perſiſted in till this is fully accompliſhed. Indeed, after a ſufficient quantity of mercury is exhibited for the removal of any latent venereal taint that might exiſt in the ſyſtem, all that we can expect farther from art, is to aſſiſt in the manner we have adviſed, in effecting a ſeparation of ſuch bones as are diſeaſed. This being done, the ſores will now be of a milder nature, and will in general heal by a continuance of the aſtringent applications we have already pointed out.

This is the practice which by experience I have found to prove the moſt ſucceſsful in caſes of ozæna. It muſt however be acknowledged, that no remedies with which we are acquainted can with certainty be depended on; and ulcers of this kind prove conſtantly extremely tedious, not only from the difficulty of reaching them with proper dreſſings, but from the oſſa ſpongioſa, when they become carious, being always ſlow in exfoliating. When however the ſyſtem is not otherwiſe diſeaſed, the means we have mentioned, being perſevered in, will very commonly accompliſh our purpoſe.

SECTION IV.

Of IMPERFORATED NOSTRILS.

CHILDREN are not unfrequently born with the vagina or anus in an imperforated ſtate; and although we know of no reaſon why the noſtrils ſhould not alſo be frequently imperforated, we are certain that it is a rare occurrence. Every practitioner, however, muſt have met with ſome inſtances of preternatural adheſions of the noſtrils, the conſequence of confluent ſmall pox, of burns, or venereal ſores.

Obſtructions of this kind are in various degrees. In ſome caſes the noſtrils are only ſlighty contracted, without producing any material impediment of the breathing. In others, they are ſo much drawn together, as hardly to admit a common probe or a ſmall quill: And in a few, the paſſage is entirely obliterated.

In all ſuch caſes it is the object of ſurgery to remove every preternatural obſtruction; but as any operation for this purpoſe is productive both of pain and inconvenience, the aſſiſtance of art is not frequently deſired. It ought undoubtedly, however, to be employed whenever the breathing is much obſtructed, or when the deformity produced by the diſeaſe is conſiderable.

When an opening is left in the obſtructed noſtril, however ſmall it may be, much aſſiſtance may be derived from it in effecting our intention. A ſmall grooved director being inſerted into it, the paſſage may be eaſily enlarged to its natural ſize, by running a ſmall biſtoury or ſcalpel into the groove in the courſe of the adheſion: But when there is no paſſage whatever, whether the affection may be owing to a natural conformation, or to any other cauſe, we ſhould, in the firſt place, by ſlow diſſection with a ſmall ſcalpel, endeavour to diſcover one of the noſtrils, taking care, with as much caution as poſſible, to keep the opening in a proper direction between the ſeptum and the contiguous external cartilage: And the paſſage being once diſcovered, it muſt be enlarged to the natural ſize in the manner we have mentioned, by the introduction of a director and biſtoury. This being accompliſhed in one noſtril, we muſt endeavour, by the ſame kind of cautious diſſection, to diſcover the other.

A clear opening being thus formed into each noſtril, our next object is to endeavour to preſerve them of a full ſize, and to prevent adheſions from forming in any part of them; which by experience we know are extremely apt to occur, and which can be prevented only by much attention.

The introduction of doſſils of lint of an adequate ſize, or of any other ſoft ſubſtance, and retaining them till there is no riſk of future adheſions, taking care however to withdraw them daily for the purpoſe of cleanſing or renewing them, might no doubt anſwer our intention: but metallic tubes, adapted to the ſize of the openings, at the ſame time that they allow the patient to breathe with freedom through the noſtrils, ſerve to diſtend the parts with more equality, and are more eaſily retained in their ſituation. Before being introduced, they ſhould be covered with ſoft leather ſpread with any emollient ointment; by which they fit with more eaſe, and will be more readily withdrawn at the different dreſſings.

Various forms of tubes have been recommended for this purpoſe. Thoſe repreſented in fig. 2. Plate XLIII. are of a form which will be found to anſwer perhaps equally well with any that have been propoſed; and they may be retained either with a bandage round the head, or with adheſive plaſters connected with them. They ſhould be employed as long as any degree of ſoreneſs or excoriation is perceptible in the courſe of the inciſions; for if they are withdrawn before the ſores are completely healed, new adheſions or contractions will very certainly enſue.

It ſometimes happens from burns, as well as from the confluent ſmall pox, that along with a contraction, or perhaps a total obliteration, of one or both noſtrils, an adheſion is produced between the noſe and the ſkin of the upper lip. In this caſe the adheſion of the lip to the noſe ſhould, in the firſt place, be ſeparated by ſlow diſſection with a ſcalpel; and the ſore thus produced ſhould be perfectly healed and firmly cicatriſed before any attempt is made to open the noſtrils. It is ſcarcely neceſſary to remark, that, during the cure, the ſore ſhould not only be kept properly covered, but, with a view to remove any improper contraction which the lip may have acquired, it ought at each dreſſing to be tied down by ſeveral turns of a double headed roller paſſed round and over the head.

SECTION V.

Of POLYPI *in the* NOSE *and* THROAT.

THE internal ſurface of the noſe is liable to excreſcences, which, from their form being ſuppoſed to reſemble that of inſects of this name, have commonly been termed Polypi. Every part of the naſal cavity, and of the back part of the throat, is liable to theſe excreſcences; but moſt frequently they originate from that part of the membrane of the noſe which lines or covers the oſſa ſpongioſa. In general they are confined to one ſide of the noſe, and they do not commonly appear ſo far back as the throat; but in ſome inſtances they occupy both noſtrils, and in others they are ſo large as to be diſtinctly perceived on looking through the mouth into the pharynx. In ſome caſes, indeed, they are found to originate from the pharynx.

The firſt warning which a patient commonly receives of this diſeaſe, is a partial loſs of ſmell, attended with a ſenſation of fulneſs or obſtruction in ſome particular part of the noſe, very ſimilar to what is experienced from the ſtuffing of the noſtrils in a common cold or catarrh. This continues to increaſe, till a ſmall tumor or excreſcence is perceived in one, and ſometimes in both, noſtrils; which in ſome inſtances never deſcends farther than to be merely perceptible when the head is ſomewhat elevated; while in others it falls a conſiderable way down upon the upper lip, and at the ſame time perhaps puſhes back into the throat.

In ſome, this elongation of the tumor continues ſteady and permanent, but in moſt inſtances the ſwelling retracts altogether within the noſtrils in dry weather, and protrudes only in rain; and more eſpecially in thick hazy weather. Indeed, the influence of weather on the ſize of theſe excreſcences is often aſtoniſhing. I have known ſome patients who in clear dry weather were not known to labour under the diſeaſe, in whom the ſwellings always protruded to a conſiderable length on the leaſt tendency to a damp atmoſphere.

Excreſcences of this nature are of various degrees of firmneſs. A great proportion of them are ſoft and compreſſible, but in ſome inſtances they are extremely firm; and at laſt have been known to acquire even a cartilaginous kind of hardneſs. Both kinds of them are apt to bleed on being fretted or roughly handled; But it is thoſe of a ſoft ſpongy nature only which are ſo remarkably affected by the weather, the firmer or fleſhy kind of polypi being ſeldom or never influenced by it.

The colour of theſe excreſcences is likewiſe variable: For the moſt part they are ſomewhat pale and tranſparent, but in ſome inſtances they are of a deep red colour; and, ſo far as I have yet had opportunities of obſerving, I would ſay, that there is ſome connection between the colour and conſiſtence of them. The experience of others may lead to a different concluſion; but in the courſe of my obſervation it has uniformly happened, that the ſoft compreſſible polypus has been of a pale complexion, while thoſe of a firmer texture have always been of a deep red.

In the commencement of this diſorder, the pain attending it is always inconſiderable; and in the ſofter kinds of it there is ſeldom much pain, even in its moſt advanced ſtages. But thoſe of a harder nature in general become painful as they increaſe in ſize, particularly on any cauſe of irritation being applied to them. In ſome inſtances, they become unequal and ulcerated over their whole extent. In this ſtate, conſiderable quantities of a thin fetid matter are diſcharged; and if a cure be not obtained by extirpation, they are now very apt to degenerate into cancer. It is proper to obſerve, however, that it is the firm fleſhy kind of polypi only which are apt to become cancerous, and that this change rarely or never happens with thoſe of a ſofter texture.

But although the ſofter kinds of theſe ſwellings very ſeldom terminate in cancer, and are rarely productive of much inconvenience in the early ſtages of the diſeaſe, or as long as the excreſcences are confined to either of the naſal cavities; in the latter ſtages of the diſorder, they are often attended with a great deal of diſtreſs. Beſides the trouble and perplexity which occurs from their falling down upon the lip, they ſometimes paſs ſo far back into the fauces, as not only to impede deglutition, but to obſtruct reſpiration; and in ſome inſtances the tumors become ſo large, as not only to diſtend the ſofter parts of the noſtrils, but to elevate and even to ſeparate and diſſolve the firm bones of the noſe. This, indeed, is not a common occurrence; but every practitioner muſt have met with it: I have ſeen different inſtances of it.

Various opinions are met with in authors of the cauſe of polypous excreſcences. By ſome they are ſaid to depend moſt frequently upon a ſcrophulous taint; while others imagine, that a venereal infection often gives riſe to them.

We will not ſay that ſwellings of this kind do not, in ſome inſtances, occur along with the venereal diſeaſe and ſcrophula. They may even be met with as ſymptoms of theſe diſeaſes. But in ſuch inſtances we would conſider the general taint of the ſyſtem in no other light than as an occaſional or exciting cauſe of the local affection, for in almoſt every caſe of polypus a local injury may be traced as the cauſe of it; and from every circumſtance relating to the diſeaſe, we conclude, that it is always of a local and circumſcribed nature. For even where a polypus originates from a venereal infection, this particular ſymptom is ſo far of a local nature, that it remains fixed and permanent after the general taint of the ſyſtem is completely removed.

All the harder kinds of polypi we ſuppoſe may originate from the ſame cauſes which produce tumors of a ſimilar texture in other parts of the body; but in moſt inſtances they appear to be connected with, and even to proceed from, a caries of the bone underneath; and it is this chiefly which renders them more hazardous and much more difficult of cure than thoſe of a ſofter nature, which, in general, we imagine are produced by a mere diſtention or relaxation of the membrana Schneideriana. When any portion of this membrane becomes inflamed, either by the effects of cold, or from external violence, if in this ſtate any part of its ſurface is ruptured or eroded, as frequently happens from picking or blowing the noſe too forcibly, a degree of weakneſs or relaxation is thus produced, which is apt to terminate in a fullneſs or prominency of the parts immediately affected; and this being increaſed by every ſucceeding cold, the diſeaſe we are now conſidering comes in this manner to take place.

The farther progreſs of the diſeaſe may depend on various cauſes; but in general it will advance quickly or ſlowly, according as the parts affected are more or leſs liable to inflammation. Thus I have known various inſtances of polypi of this kind remaining ſmall and perfectly ſtationary for a great number of years, when the patients have not been obliged to be much expoſed to the open air; while it commonly happens, among the poorer claſs of people, who are expoſed to every inclemency of weather, and who are therefore more liable to frequent returns of catarrh, that the diſeaſe advances with much more rapidity.

In the treatment of every diſeaſe, it is a matter of much importance to be able to form a juſt prognoſis, not only of the manner in which the ſymptoms may probably terminate, but of the effects to be expected from the different remedies that may be employed for them; and in no inſtance is this a more deſirable object than in the management of polypous excreſcences of the noſe.

By ſome writers upon this ſubject, we are led to conclude, that polypi are always of a doubtful nature with reſpect to the event or termination of them: That for the moſt part they are even of a dangerous nature; and therefore that we ought to conſider every perſon in whom they occur as in a hazardous ſtate: Whilſt others aſſert, that although they may occaſionally be productive of ſome inconvenience, yet that they are ſeldom attended with any kind of riſk.

Some, again, are ſo extremely timid with reſpect to polypi, as to ſuppoſe that they ought never to be meddled with; and alledge, that there is more chance of doing harm than good by any operation we can employ for removing them; whilſt by others we are told that they may be taken away with ſafety.

This difference of opinion reſpecting the nature of polypi, and of the effects to be expected from the remedies employed for them, has ariſen in a great meaſure from authors not having diſtinguiſhed the different kinds of theſe excreſcences with ſuch preciſion as they ought to have done: For while in one variety of the diſeaſe there is little riſk to be dreaded, and no great cauſe to doubt of our being able to remove it; in others there is undoubtedly a good deal of hazard, and much reaſon to fear that no remedies whatever will prove effectual in preventing a return of it.

We have already obſerved, that theſe tumors are of various degrees of conſiſtence; and from all the experience which I have had in the treatment of them, I am led to conclude, that in general the riſk with which they are attended is nearly in proportion to their fimneſs. The ſoft compreſſible kind of polypi are not only leſs painful than the others, but the removal of them may at any time be attempted with more ſafety. Indeed they are not commonly attended with pain; and it ſeldom happens that any material inconvenience occurs from the extirpation of them: But the firm fleſhy kind of polypi are in general not only painful, but are much more apt to return after being extirpated. In forming an opinion, therefore, of the probable event of them, this circumſtance of texture deſerves particular conſideration. In a ſoft, yielding polypus, if the conſtutition is healthy, we may, perhaps in every inſtance give a favourable prognoſis: for, as long as the diſeaſe remains of a moderate ſize, there is ſeldom any inconvenience experienced from it, and therefore there is no neceſſity for meddling with it; and again, when by acquiring a great additional bulk, the removal of the tumor is rendered neceſſary, it may always be undertaken with much probability of ſucceſs. But, on the contrary, in polypi of a fleſhy conſiſtence, and eſpecially in tumors of even a firmer texture than this, the patient or his friends ought always to be informed of the riſk being conſiderable: for it frequently happens that excreſcences of this kind cannot be entirely removed; and even when this is eaſily and completely practicable, they are apt to regenerate, and in ſome inſtances, as we already obſerved, to become cancerous. In all ſuch caſes, therefore, a guarded prognoſis ought to be given; otherwiſe, if the diſeaſe ſhould afterwards return, the operator would be juſtly blameable, at the ſame time that the operation itſelf would fall into diſcredit.

Indeed ſome practitioners are ſo averſe to this operation in all caſes of firm or hard polypi, that they always decline to meddle with them. As long as they remain ſtationary, and are not attended with pain, if they do not obſtruct the breathing or deglutition, they ought not to be touched: But whenever they become painful, and eſpecially when they have acquired ſuch a bulk as to obſtruct either the paſſage to the ſtomach or lungs, we ought certainly to endeavour to extract them, if this be not already rendered impracticable by their adhering through the whole of their extent to the bones of the noſe, and by theſe being rendered carious; which they are apt to be in the late ſtages of this diſorder.

All the ſofter kinds of polypi which are liable, as we have already deſcribed to be affected by the ſtate of the weather, may frequently be prevented from acquiring any additional bulk by the uſe of aſtringent applications, particularly by a ſtrong ſolution of alum, a decoction of oak bark, or the application of vinegar or ardent ſpirits. By one or other of theſe being applied from time to time over the ſurface of the tumors, I have known different inſtances of their continuing for a great length of time to give no kind of diſturbance; and, in ſome caſes where the remedy has been freely employed, they have even ſhrivelled and become conſiderably ſmaller. It muſt be acknowledged, however, that they have never accompliſhed a cure; but it is a matter of no ſmall importance our being able by gentle means to render any painful operation unneceſſary.

On the firſt appearance, therefore, of a polypus, we ought by a free uſe of ſome aſtringent application to endeavour to prevent its farther increaſe; but when theſe do not ſucceed, we are to conſider by what mode the tumor may be moſt effectually removed.

Various methods have been propoſed for the removal of polypi: namely, the uſe of cauſtic or corroding applications—the actual cautery—the paſſing of a ſeton or cord through the diſeaſed noſtril—exciſion with a ſcalpel or ſciſſors—the application of a ligature round the neck of the tumor—and evulſion or extraction by a proper application of the forceps.

An ignorance of the circulation of the blood, and of the eaſy method with which we are now acquainted of putting a ſtop to hemorrhagies, led in earlier times to the practice of removing tumors, wherever they were ſituated, by corroſive applications, and even by the uſe of the actual cautery. If this practice was conſidered as neceſſary in other parts of the body, it is not ſurpriſing to find it propoſed for the removal of polypi in the noſe, where the effects of hemorrhagies were more dreaded. Cauteriſing irons were therefore invented for this purpoſe, together with metallic tubes for conducting them. But even with the utmoſt attention there is no poſſibility of deſtroying the diſeaſed parts without injuring thoſe that are ſound. Remedies of this kind are therefore more apt to do harm than to produce any advantage; ſo that they are now very generally laid aſide; as are likewiſe all kinds of corroding applications, which are equally liable to uncertainty, by their being apt to ſpread to the contiguous ſound parts in the cavity of the noſe and throat.

As it has been imagined by ſome practitioners, that excreſcences of this kind may be removed by inducing a ſuppuration upon them, it has been propoſed to inſert a cord of ſilk or cotton into the diſeaſed noſtril, and one end of it being taken out at the mouth, by daily drawing it back and forward, and by covering that part of it which comes into contact with the tumor, with a ſlightly irritating ointment, thus to create ſome degree of inflammation and conſequent ſuppuration over it.

We will readily allow, that in this manner a plentiful flow of matter may be excited; but it is not probable that this can have much influence in diminiſhing the ſize of the tumor. Till of late, indeed, it was commonly imagined that the formation of pus is neceſſarily attended with a diſſolution of the ſolid parts in which it occurs. Upon this principle Mr. Daran and others have endeavoured to explain the operation of bougies in obſtructions of the urethra; and a ſimilar idea ſuggeſted the remedy of which we are now ſpeaking, in polypous excreſcences of the noſe. But it is now known, as we have elſewhere fully ſhown, that the diſſolution of ſolid parts is by no means neceſſary for forming pus. It is alſo known, that in diſeaſes of the urethra, bougies prove effectual only by their form, and by the preſſure which they produce; and we have no difficulty in ſaying, that it is in this manner only by which a cord, if it ever proves uſeful, can have any effect in removing polypi of the noſe. As the paſſage of the noſtrils is very unequal, being wider in one part than another, and as the roots of polypi are frequently ſo ſituated that no preſſure can be applied to them, we are not of opinion that they can ever be removed by a cord paſſed through the noſe, as many have imagined. But after the extirpation of polypi in the manner we ſhall afterwards point out, when their roots are not entirely removed, there can be no impropriety in our endeavouring in this manner to clear the paſſage more effectually. It was for this purpoſe ſolely, we may remark, that the practice we are now conſidering was originally propoſed by that judicious obſerver Monſieur Le Dran. But although it might, in this manner, ſometimes prove uſeful, yet from being a troubleſome and diſagreeable application, it has ſeldom been employed. We ſhall have occaſion however, in a ſubſequent part of this ſection, to ſpeak of it again.

In other parts of the body, the removal of tumors by exciſion is univerſally preferred to every other method; and it would likewiſe be employed in polypi of the noſe, were it not for their inacceſſible ſituation. But it ſeldom happens that they are ſo ſituated as to render this mode of treatment practicable; for although ſcalpels and ſciſſors of various forms have been invented for this purpoſe, the roots of polypi are in general ſeated ſo high in the noſtrils, and the paſſage is for the moſt part ſo completely filled by the tumor itſelf, as to render it always difficult, and often impoſſible to remove them by exciſion.

But when it is found that the tumor originates from the under part of the noſtril, and when the point of a ſcalpel can be made to reach the root of it, we ought, without heſitation, to employ this method of taking it away, even in preference to that by ligature: for in this manner the whole of the tumor may be more effectually removed; and in this ſituation there is no reaſon to be afraid of hemorrhagies, as compreſſion can be readily applied to any blood veſſel that may be cut in the under part of the noſtrils. We rarely find however, as has been already obſerved, that a polypus is ſeated ſo far down in the noſtrils as to render this method of treatment practicable.

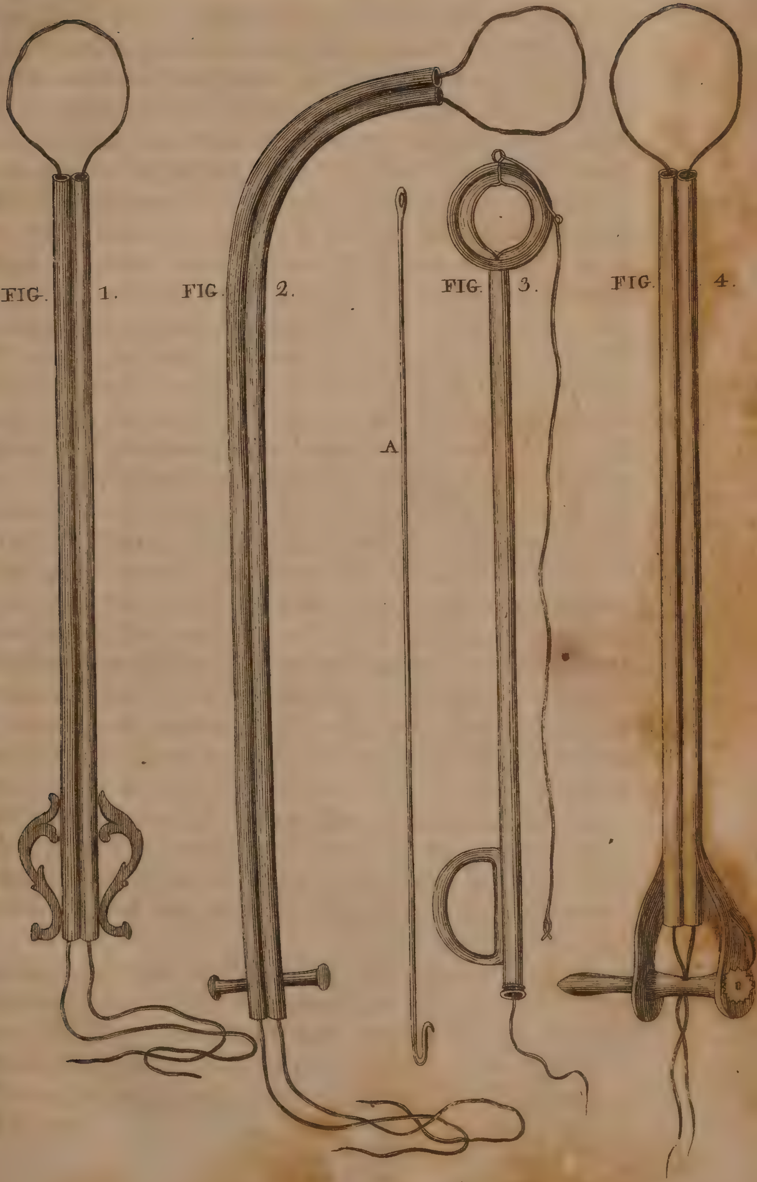
It therefore appears that all the means we have yet conſidered for the removal of theſe excreſcences, are either inadequate for the effect, or altogether inadmiſſible; and hence we are under the neceſſity of employing either the method by ligature, or that by extraction with the forceps.

As the removal of a polypus, by tearing or twiſting it off, is attended with much more pain than the application of a ligature round the neck of it, the latter would always have been preferred, if it had been conconſidered as equally practicable. And as we now know that it can be done in a very ſafe and eaſy manner, it will probably in future be very generally employed. The method we allude to, is that which Monſieur Levrette of Paris firſt recommended a conſiderable time ago, for the removal of polypi in the vagina, and which we now find may be uſed with equal propriety in ſimilar affections of the noſe and throat. The following is the method of applying it in polypi of the throat.

Fig. 1. Plate XLIV. repreſents a piece of pliable ſilver wire paſſed through a double canula, and the wire ſhould be long enough when doubled to paſs through the noſe into the pharynx. Let the wire be taken from the canula, and the doubling at the end of it be ſlowly and gently inſinuated through one of the noſtrils: As ſoon as it appears in the throat, the operator, with his fingers inſerted into the mouth, muſt open the double ſufficiently for paſſing it over the pendulous extremity of the tumor; and having preſſed it down to the neck or root of it, the two ends of the ligature hanging out at the noſtril muſt be again paſſed through the canula; which is now to be inſerted into the ſame noſtril, and puſhed back along the courſe of the wire till it comes into contact with the root of the polypus. The fingers ſhould ſtill be continued in the throat to preſerve the ligature in a proper ſituation; and the canula being placed in the manner we have directed, the wire muſt be drawn tolerably tight; and the ends of it being fixed on the wings or handle of the canula, as in Plate XLV. fig. 1. it muſt be left in this ſituation till the following day, when being again drawn ſomewhat tighter, and this being daily repeated, the tumor will fall off ſooner or later according to its ſize. When the excreſcence is ſmall, it will probably drop in the courſe of the ſecond day; and tumors of even a large ſize will come away on the third day. It is better however to make the compreſſion in a more gradual manner: for when the wire is drawn with much force, inſtead of acting as a ligature, and removing the tumor by compreſſion, it removes it too quickly, by cutting it acroſs, and may thus be equally productive of hemorrhagies as if the operation had been done with a ſcalpel.

In this manner all thoſe polypi may be removed which either originate in the throat, or which proceed back from the noſtrils into the fauces; and the practice may be extended even to thoſe which are deeply ſeated in the pharynx, if the ligature can be properly applied

PLATE XLIV.



applied over them either with the fingers; with the aſſiſtance of forceps; or with an inſtrument ſuch as is delineated in Plate XLVI. fig. 3. Some inſtances indeed have occurred of excreſcences ſeated too far down in the œſophagus for admitting of ligatures being applied upon them in this manner; nor is it admiſſible, even where the upper part of the tumor is acceſſible, if the baſe or neck of it be ſo low down as to prevent the ligature from being applied to it. In the third Volume of the Phyſical and Literary Eſſays of Edinburgh, there is a caſe related in which a very ingenious method was put in practice by the late Mr. Dallas for ſurrounding a deep ſeated polypus with a ligature; and although inſtances of ſuch excreſcences are extremely rare, yet as they are ſometimes met with, I think it right to give a delineation of the inſtrument which in this inſtance was ſucceſsfully employed.

In this caſe both the breathing and deglutition were much impeded by a large fleſhy excreſcence originating in the œſophagus, a conſiderable portion of which was thrown into the mouth by every exertion to vomit; but it ſoon retracted and remained perfectly concealed within the pharynx till vomiting or retching was again excited. This portion of the tumor which occaſionally protruded, was entirely removed by the method we have mentioned, and which we have more particularly deſcribed in the explanation to Plate XLVII. By this means the patient was relieved from much inconvenience and diſtreſs; but another branch of the tumor which extended towards the ſtomach becoming afterwards very large, he died by the effects of it in about two years from the operation.

We think it right to remark, that this patient might probably have been ſaved by the uſe of the ligature and double canula ſuch as we have deſcribed, and that in ſimilar caſes it is to be conſidered as perhaps the beſt means of relief. When a polypus is ſuſpected to have formed in the œſophagus, if no part of it is obſerved to protrude up towards the pharynx, there will be much cauſe to imagine that it proceeds down towards the ſtomach; ſo that if the double of a piece of flexible wire be puſhed down the œſophagus, the pendulous part of the tumor may very probably be laid hold of in withdrawing it; or, if one attempt ſhould fail, other trials may ſafely be made with it: And as ſoon as the double of the ligature is found to be firmly fixed, all that portion of the tumor which it ſurrounds may be eaſily removed by the application of the double canula in the manner we have mentioned. It is proper, however, to obſerve, that the ligature and canula ſhould both be carried through one of the noſtrils into the œſophagus; for in this manner they will not prove nearly ſo inconvenient as when paſſed through the mouth, and they may be applied with equal eaſe and advantage. For this purpoſe the canula muſt have ſome degree of curvature, as is repreſented in Plate XLIV. fig. 2.

Ligatures may in general be applied round polypi of the back part of the noſe and throat in the manner we have directed, without much interruption to the breathing; but when they are deeply ſeated in the œſophagus, and on all occaſions when the application of the ligature is difficult and tedious, it is proper to ſecure an eaſy and free reſpiration during the operation by previouſly adviſing bronchotomy. By this no additional riſk is incurred, for it may with eaſe and ſafety be accompliſhed; and it puts it in our power to finiſh the operation more perfectly than we otherwiſe could do. It is likewiſe proper to remark, that although the operation may often be done without any aſſiſtance from a ſpeculum oris, yet whenever it proves tedious, and when the ligature cannot be applied with much eaſe over the tumor, this inſtrument ought to be employed.

We have now to mention the method of applying a ligature to a polypus ſeated in the anterior part of the noſe, and which, inſtead of paſſing back into the pharynx, proceeds down one of the noſtrils towards the upper lip. Let the double of the ligature be paſſed over the moſt depending part of the polypus, and be ſlowly puſhed up to the root of it with the ſlit probe Plate XLVI. fig. 2. The probe being given to an aſſiſtant to preſerve the ligature in this ſituation, the two ends of it muſt be paſſed through a double canula; which being inſerted into the noſtril on the oppoſite ſide of the polypus, and being puſhed eaſily along till it reaches the root of it, the ligature muſt now be drawn ſo tight as to make ſome impreſſion on the root of the tumor, when the ends of it muſt be tied to the wings of the inſtrument, and muſt be daily pulled ſomewhat tighter till the tumor drops off.

In this manner every polypus in any part of the noſe may be extirpated. Thoſe who have not ſeen it put in practice may be apt to doubt of this aſſertion; but a few trials will ſhow that it is not only the moſt effectual method, but the ſafeſt and eaſieſt that has yet been propoſed of removing every excreſcence of this kind: And it has the advantage over every other method of applying ligatures upon polypi in the noſe, of anſwering equally well in the large as in the ſmaller kinds of them—and it may even be applied where the tumor is ſo large as to diſtend the noſtril to a conſiderable ſize. In Plate XLVI. fig. 1. there is delineated a remarkable form of a polypus extirpated in this manner under the direction of Dr. Monro, who was the firſt, I muſt obſerve, who put in practice this method of removing polypi from the noſe and fauces. This polypus filled the noſtril completely; to ſuch a degree indeed, that it could not have been removed in any other manner; not even with forceps, for the blades of the inſtrument could not have been inſerted.

Beſides this, another method has been propoſed of applying ligatures round polypi in the noſtrils: By introducing a ligature through the affected noſtril into the throat, and paſſing it in ſuch a manner that the doubling may include the root of the polypus, if the oppoſite ends of it be taken out at the mouth, they may be ſufficiently twiſted, it is alledged, for removing the tumor.

In a few caſes this might poſſibly anſwer, but it would often fail: I think it right, however, to mention it, as it is recommended by a very judicious practitioner, Mr. Cheſelden. Fig. 2. Plate XLV. exhibits a repreſentation of a polypus ſurrounded with a ligature in this manner.

Various forms of forceps have been invented for the purpoſe of removing polypi. Thoſe that anſwer the intention beſt, and that are moſt generally uſed, are repreſented in Plate XLVIII. Thoſe of a ſtraight form are intended for extracting polypi by the anterior nares, and the crooked forceps are employed by ſome practitioners for the removal of thoſe excreſcences which paſs into the throat behind the uvula. We have ſhown indeed that polypi of this kind may be more eaſily removed by ligature, but we think it right to delineate ſuch forceps as are uſed by thoſe who prefer a different method.

In proceeding to extract a polypus with forceps, the patient ought to be firmly ſeated, with his head leaning back and ſupported by an aſſiſtant behind; and as it is of much importance our being able to diſcover as nearly as poſſible the origin of the excreſcence, ſome advantage may be obtained from the face being placed in ſuch a manner that the light of a clear ſun may fall into the noſtril.

In the ordinary method of performing this operation, the ſurgeon now takes the forceps, fig. 2. Plate XLVIII. and inſerting one of the blades on each ſide of the polypus, he carries them eaſily along till he brings their points as near as poſſible to the neck of it, when he lays hold of it firmly, and endeavours to extract it entire, either by pulling directly downwards, or by moving the forceps from one ſide of the noſtril to another; or, as ſome more properly adviſe, by turning or twiſting the polypus round till it is com-

PLATE XLV.

FIG. 1.

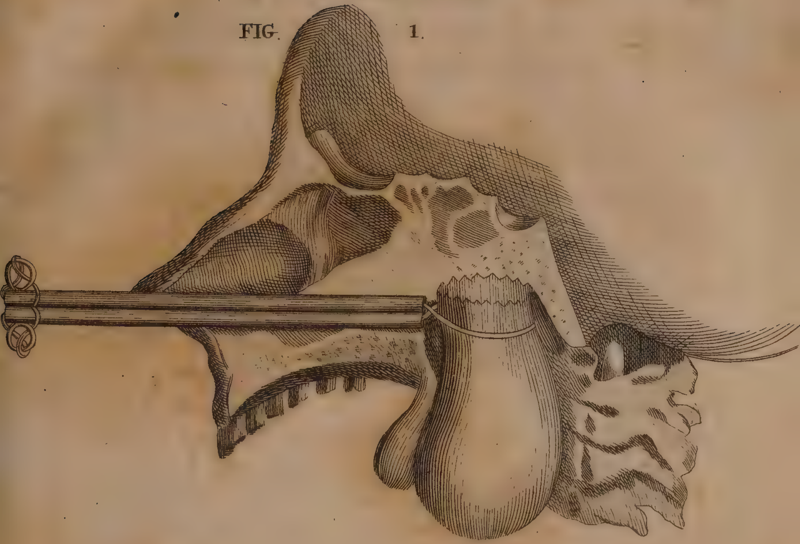


FIG. 2.

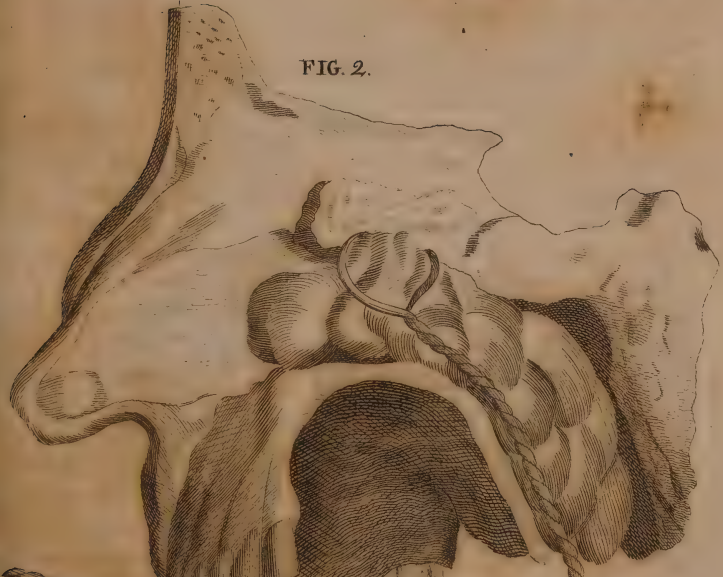


PLATE XLVI.

FIG. 1.

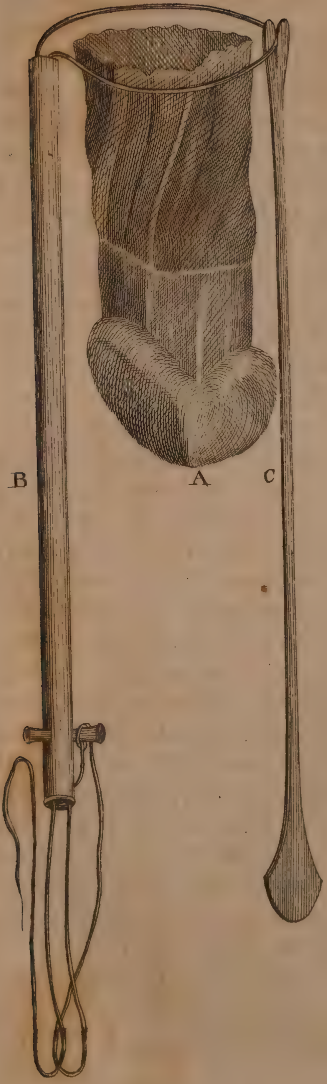


FIG. 2.

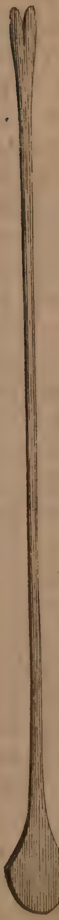
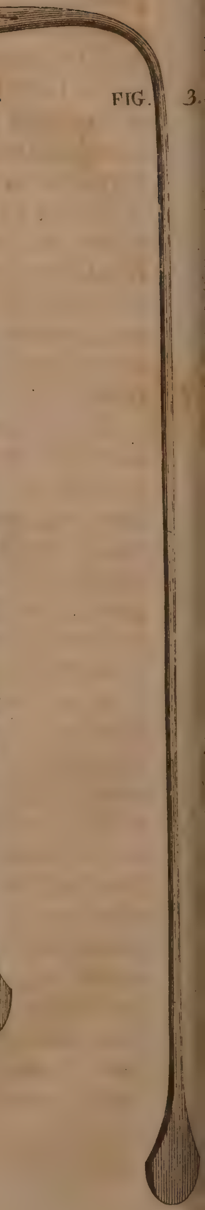


FIG. 3.



pletely ſeparated. By this laſt method I think it probable that the root or attachment of the excreſcence will be more readily looſened than in any other way, at the ſame time that that part of the lining membrane of the noſe will not be ſo much injured as when the tumor is tore away by being pulled either in a lateral direction or perpendicularly downwards.

When a polypus is of a tolerably firm texture, if the operation be properly conducted, we may frequently be able to bring it all away at once: but when it is very ſoft and yielding, it commonly requires repeated applications of the forceps; and we ſhould never deſiſt as long as any portion of the excreſcence remains which can with propriety be removed.

It is proper, however, in this place to obſerve, that the firſt application of the forceps is commonly attended with ſuch a conſiderable diſcharge of blood, that beginners are apt to deſiſt before the operation is nearly finiſhed, from their being afraid of fatal conſequences from the hemorrhagy; but this ought not in general to be regarded, as long as by a farther uſe of the forceps we can extract any more of the polypus. And even when the operation is finiſhed, if the patient is in any degree robuſt and plethoric, ſome advantage may be derived from our admitting of a farther diſcharge, by which inflammation may be prevented, which otherwiſe might be productive of troubleſome conſequences. The hemorrhagy, however, ought not to be allowed to proceed ſo far as to run any riſk of hurting the patient. This, indeed, is not a frequent occurrence; for it does not ſo readily happen as is commonly imagined by thoſe who have not had frequent opportunities of ſeeing this operation put in practice. I will not pretend to ſay, that inſtances may not occur of more blood being loſt by this operation than is proper; but I can ſafely aſſert, that it is not a common occurrence. When it is found, however, that the hemorrhagy is proceeding too far, we ought immediately to employ thoſe means which we know from experience are moſt effectual in putting a ſtop to it; but as we have already treated fully of them in Section III. of this Chapter it is not neceſſary to enter upon them at preſent.

As it ſometimes happens that ſome parts of the roots of polypus are not extracted by the forceps, we are deſired by ſome practitioners to deſtroy them by inſerting cauſtic or corroſive applications into the noſtrils immediately after the operation. Unleſs, however, we can evidently ſee the part on which the cauſtic ſhould be applied, I am clearly of opinion that this practice ſhould not be adopted; for otherwiſe we muſt work entirely at random, and will more probably do harm than good. But when, by expoſing the noſtril to a clear light, we can bring the ſeat of the excreſcence into view, we may with propriety touch any parts of it that remain with a piece of lunar cauſtic properly covered with a canula, in order to protect the contiguous ſound parts. An inſtrument for this purpoſe is repreſented in fig. 1. Plate XLVII. This, however, ſhould not be attempted on the day of the operation, as is commonly adviſed; for while any diſcharge of blood continues, we cannot obtain ſuch a clear view of the parts affected as is neceſſary: But it may properly enough be done on the following day; and the application of the cauſtic ſhould be repeated every ſecond or third day, as long as any remains of the polypus are obſerved.

When, again, the root of a polypus lies ſo deep that it cannot be diſcovered, if we find, either by the introduction of a probe, or by the breathing through this noſtril not being ſufficiently free, that the excreſcence is not entirely removed by the forceps, although, for the reaſons mentioned above, we are averſe in this ſituation to the application of cauſtic, it may be extremely proper to endeavour to deſtroy it by means of a more harmleſs nature. In this caſe, the practice we have deſcribed, of paſſing a ſeton through the noſtril into the throat might probably prove uſeful; but the

ſame

PLATE XLVII.

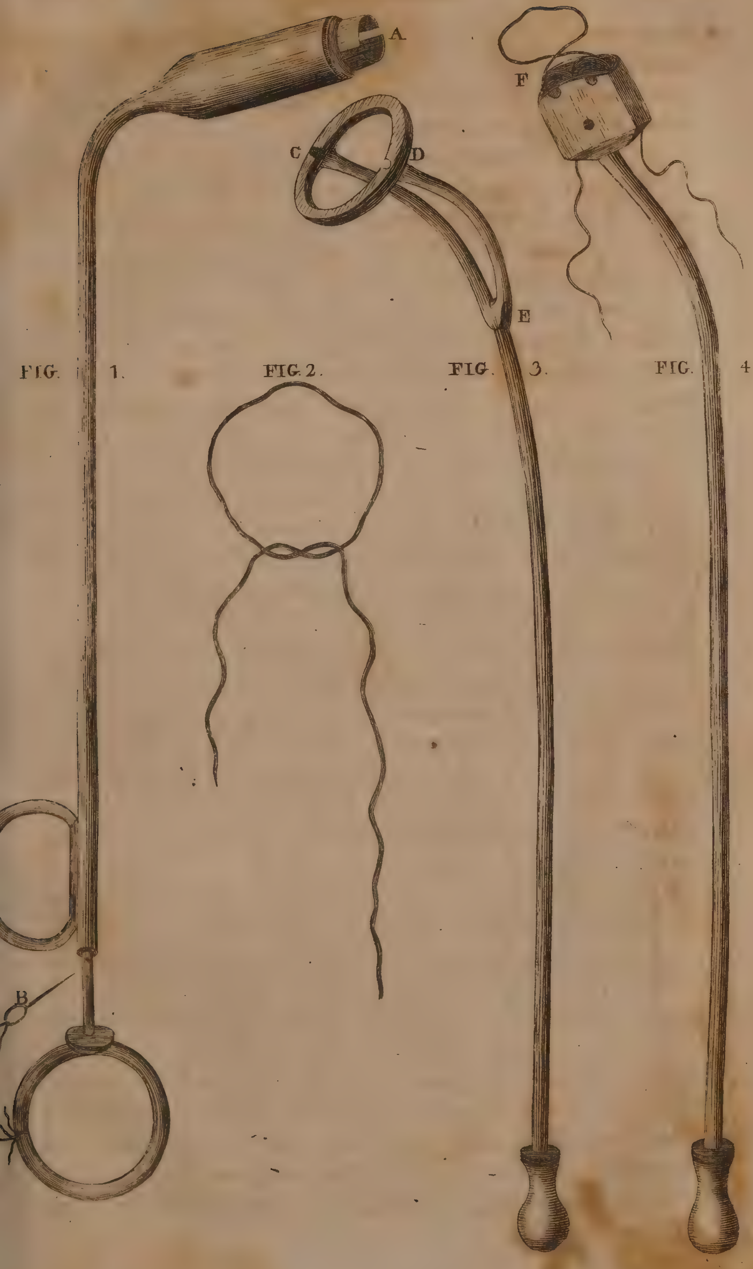


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

ſame intention may be accompliſhed with more certainty by the uſe of a large bougie. We have already had occaſion to remark, that in the removal of obſtructions in the urethra, bougies ſeem to operate chiefly by mechanical preſſure; and there is cauſe to imagine that upon the ſame principle they may be employed with advantage for the removal of thoſe parts of polypous excreſcences in the noſtrils that cannot be taken away with the forceps. Nay more, were we conſulted early in the diſeaſe, before the excreſcence has acquired any conſiderable bulk, they might, I think, be ſucceſsfully employed in preventing their farther increaſe; and if duly perſiſted in, they might, in ſome inſtances, in this incipient ſtate of the affection, remove them entirely. Practitioners, however, are ſeldom adviſed with, as has been already remarked, till the diſeaſe has gone too far to admit of this. I have only had one opportunity of trying it; but in this caſe, the effects of it were ſuch as to juſtify our putting it to the teſt of future experience.

The perſon in whom it was employed, had for ſeveral weeks complained of a kind of ſtuffing and interruption to breathing in one of his noſtrils. On looking into it, I clearly ſaw and touched with the probe, a ſmall, pale coloured, ſoft polypus, at a conſiderable depth. As it did not yet produce much inconvenience, I did not think of adviſing it to be extracted; but conſidering it as a fit caſe for trying the effects of compreſſion, a roll of bougie plaſter of a proper ſize was introduced along the courſe of the noſtril; and being gradually increaſed in ſize, the paſſage through the noſtril became clear and pervious; and in the courſe of ſeven or eight weeks the excreſcence diſappeared almoſt entirely; but the patient was at this time obliged to go abroad, and I have not ſince heard of him.

In the latter part of the treatment of this caſe a ſilver tube, covered with plaſter, was employed; by which the breathing went freely on; and being of ſuch a length as to paſs entirely into the noſtril, it was kept in with little inconveniency. The tube may be prevented from falling out or from paſſing back to the throat, by a piece of adheſive plaſter connected with it being applied to the upper lip, or by fixing it to a piece of narrow tape paſſed round the head.

In deſcribing the operation, I proceeded upon the idea of the forceps in common uſe being to be employed; and when the excreſcence is ſmall, they anſwer the purpoſe as well as any other: But when the polypus is ſo large as nearly to fill the noſtril, they cannot be either eaſily or properly applied: for the two blades of the forceps being both introduced at once, they cannot but with much difficulty be puſhed deep into the noſtril already much obſtructed; and the more they are preſſed forward upon the excreſcence, and the nearer it is brought to the axis of the inſtrument, the more widely the blades of it are neceſſarily opened at their extremities; by which the tumor cannot be ſo equally compreſſed, nor is there ſuch a chance of extirpating the root of it by means of them, as if they were ſo conſtructed as to apply preſſure equally through their whole length.

To remedy theſe inconveniences, ſeveral improvements have been propoſed; but the beſt I have met with is one by the very ingenious Dr. Richter, of Gottingen. A repreſentation of it is given in Plate XLVIII. fig. 3. This inſtrument may be uſed in the ordinary way by introducing both blades at once when the polypus is ſmall; but when the tumor is large, it will be found to anſwer better to introduce the blades in the ſame manner as we do midwifery forceps by inſerting them ſeparately. One of the blades being carried ſlowly and cautiouſly forward along the courſe of the polypus, the other muſt in like manner be introduced at the oppoſite ſide of it, ſo that they may now be firmly locked together at the joint. The blades are accordingly made to ſeparate eaſily, and to fix in

ſuch

PLATE XLVIII.

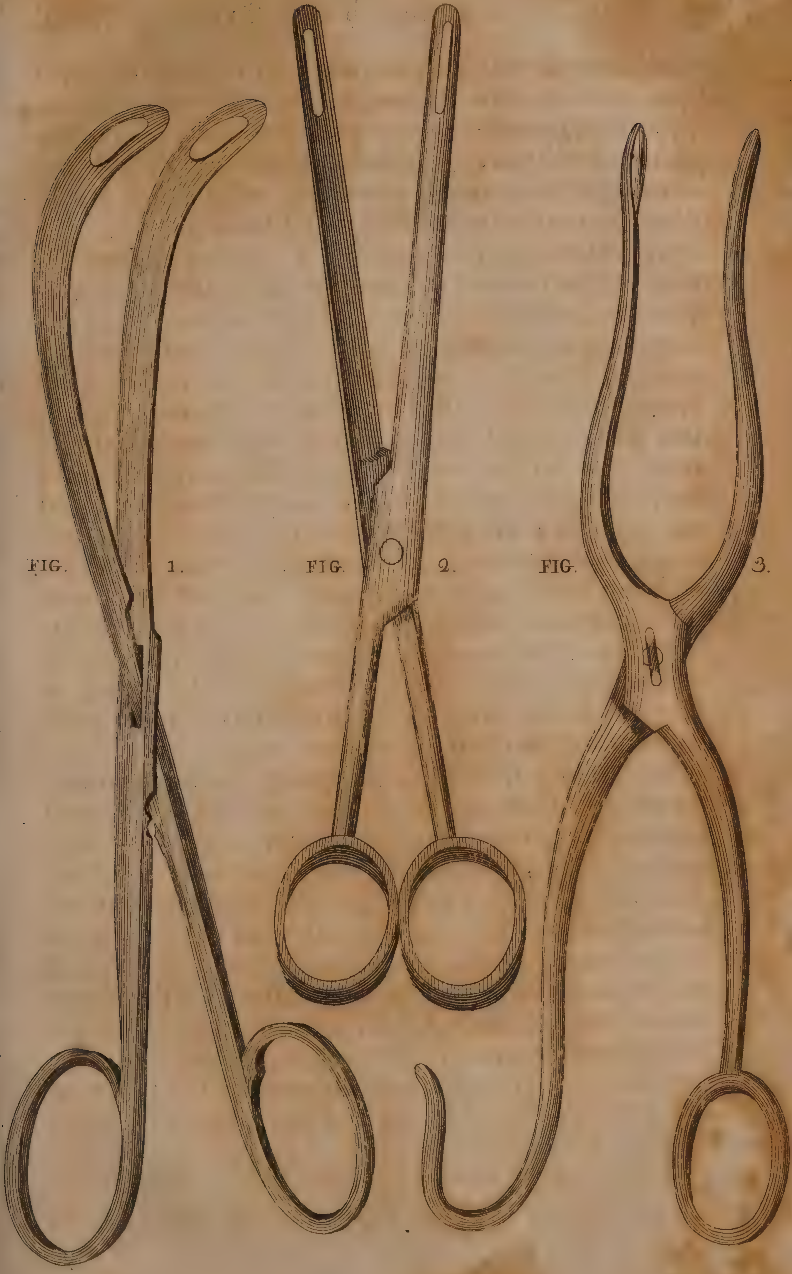


FIG. 1.

FIG. 2.

FIG. 3.

ſuch a manner as to admit of their being employed in the way we have directed.

Theſe and every other variety of forceps employed for this operation, ought to be as thin and ſlender in that part of them which is inſerted into the noſe as the nature of the diſeaſe will admit; for I muſt again obſerve, that the ſtraitneſs of the part in which we have to operate, is one of the principal difficulties we have to encounter. But when the forceps are made of well tempered ſteel, they need never be ſo thick and bulky as they are commonly made.

When, however, polypi have acquired a large ſize, the obſtruction they produce in the noſtril is in ſome inſtances to ſuch a degree, that even with this and every other kind of attention there is no poſſibility of inſerting the forceps. In ſuch circumſtances, as a conſiderable ſpace may be gained by laying the noſtril open, it may in ſome inſtances be proper to divide the cartilaginous part of it by a longitudinal inciſion; and after extracting the tumor, to reunite the divided parts either by adheſive plaſters or with one or more ſutures.

At the ſame time, however, that I mention this, I think it right to obſerve, that it is a meaſure which ought in no inſtance to be haſtily adopted; but I alſo think, that it ſhould not be univerſally condemned, as we find it to be by ſome practitioners. I do not imagine that it would in every caſe prove ſucceſsful: but when a polypus has already become ſo large as entirely to fill the noſtril; when therefore no forceps can be inſerted for removing it; when the tumor is ſtill continuing to increaſe; and when of courſe there is much reaſon to ſuſpect that it may terminate fatally if it be not extracted; it will ſurely be better to give the patient any ſmall chance that may be derived from the practice we have mentioned, than to leave him to die in miſery; which in all probability he would do were no attempt made for his relief. If on laying the noſtril open, it is found that the tumor can be with ſafety removed with the forceps, a complete recovery may poſſibly be obtained; and thus the pain which the patient has ſuffered, and the trouble of the operator, will be amply rewarded, whilſt at the ſame time no material injury will be done, nor no kind of riſk incurred, if on laying the parts open it is diſcovered that no part of the tumor can with propriety be taken away.

In the firm fleſhy kind of polypi, which in ſome inſtances degenerate into cancer, when it is found that the tumor is already ulcerated, and that the contiguous cartilages and bones of the noſe are affected by it, it would no doubt be imprudent to adviſe the treatment we have mentioned, for no advantage would probably accrue from it; the patient would be made to ſuffer a great deal of unneceſſary pain; and the operation itſelf would be brought into diſrepute: but in the ſofter kinds of the diſeaſe, which rarely or never become cancerous, and when the more external bones and cartilages of the noſe are not affected, we ought without heſitation to adopt it, when the tumor, as is here ſuppoſed to be the caſe, is meant to be removed with the forceps, and when this cannot be done in any other manner.

In the caſe of a firm fleſhy excreſcence, which filled the noſtril ſo completely that the forceps could not be introduced for removing it, a method was put in practice by Dr. Richter for diminiſhing the ſize of the tumor; which to a certain degree anſwered the purpoſe, and afforded conſiderable relief. A hole or opening was made through the centre of the excreſcence by a common trocar, made red hot and covered with a canula, being puſhed along the whole courſe of it. By this means a paſſage was formed through which the patient breathed eaſily, and the tumor was much leſſened; but the Doctor was unfortunately prevented from attempting to complete the cure either by extraction or otherwiſe, by the patient leaving the place. This caſe, however, affords an uſeful practical hint, and points out a mode of treatment which in tumors of this particular kind may in ſome inſtances be ſucceſsfully employed.*

I have thus deſcribed the method of extracting polypi of the noſe with forceps; but I muſt again remark, that they may be removed both with more eaſe and ſafety with the ligature: and as this mode of operating is admiſſible in perhaps every caſe that can occur, it ſeems only to require to be more generally known to be very univerſally preferred.

SECTION VI.

Of Extirpation of the TONSILS.

THE Amygdalæ or Tonſils are frequently, even in a natural ſtate, ſo large as almoſt to fill up the paſſage from the mouth to the throat. As long, however, as they remain ſound, and are not attacked with inflammation, any inconvenience produced by this is not commonly of much importance: but tonſils of this enlarged ſize are very apt to inflame on the patient being much expoſed to cold; and frequent returns of inflammation are often attended with ſuch an addition of bulk as to produce nearly a total obſtruction to the paſſage of food, drink, and air.

It is this enlarged ſtate of the amygdalæ which in general is termed a Scirrhoſity of the Tonſils; but we think it right to obſerve, that the term Scirrhus appears here to be very improperly applied; for, excepting the circumſtance of a firm tumor, every other characteriſtic of ſcirrhus is in theſe affections of the tonſils very commonly wanting. A real ſcirrhus is attended with frequent ſhooting pains, and it is a ſwelling of ſuch a nature as generally terminates in cancer: Now we know, that pain very ſeldom occurs in caſes of enlarged tonſils, except from inflammation: while in an inflamed ſtate, they are frequently indeed very painful; but as ſoon as the inflammation ſubſides, no more pain is experienced, and they remain perfectly eaſy and indolent till the patient is again expoſed to cold. This, however, is never the caſe with ſwellings of the real ſcirrhous kind; for whenever they become painful, they uniformly proceed to turn worſe: and, again, enlarged tonſils are ſeldom if ever known to terminate in cancer. I never knew an inſtance of their doing ſo; and few practitioners, I imagine, have met with it.

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* For a more particular account of this caſe, and of the forceps mentioned above, V. Auguſti Gottlieb Richteri Obſervationum Chirurgicarum faſciculus ſecundus. Gottingæ, 1776.

Mr. Sharpe, when treating of this ſubject, recommends a more frequent extirpation of enlarged, or what he terms Schirrhous Tonſils, than what has hitherto commonly prevailed; and he is induced to do ſo, from having obſerved that the diſorder never returns, as it too freequently does after the extirpation of ſcirrhous tumors in other parts. His words being much in point, I ſhall tranſcribe them. "All other tumors of the ſcirrhous kind, whether of a ſcrophulous or cancerous nature, are ſubject to a relapſe; the poiſon either remaining in the neighbourhood of the extirpated gland, or at leaſt falling on ſome other gland of the body. In this caſe, I have never met with one ſuch inſtance; and the patient has always been reſtored to perfect and laſting health."*

Mr. Sharpe has here communicated a very intereſting fact; which is rendered the more valuable, by coming from a man of character, and whoſe practice was very extenſive. By many, however, the truth of it has been doubted, from its being univerſally known that ſcirrhous tumors frequently return in other parts of the body after being extirpated. It would, indeed be ſurpriſing to find the extirpation of ſcirrhous tonſils prove always ſucceſsful when the ſame operation often fails when practiſed for ſimilar affections in other parts. But the explanation we have given ſets it in a more diſtinct point of view. Theſe tumors of the amygdalæ, commonly termed Scirrhous Tonſils, are not of the true ſcirrhous nature; and hence it is that they never degenerate into cancer, or return after extirpation; and this is accordingly a very weighty argument for removing them as ſoon as they become ſo large as to impede either deglutition or reſpiration. Till this, however, takes place to a conſiderable degree, no practitioner ought to adviſe this operation; for, as it is attended with a good deal of pain, it ought to be avoided as long as the ſafety of the patient does not render it abſolutely neceſſary; but whenever the tumor becomes ſo large as to produce much interruption to the paſſage of food and air, there ſhould be no heſitation in recommending it.

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* V. Critical Inquiry, &c. by Samuel Sharpe. Fourth Edition, ſection VII.

Different methods have been recommended for removing enlarged tonſils. Some adviſe the repeated application of the actual or potential cautery: Others recommend exciſion with the ſcalpel or with crooked ſciſſors: And, laſtly, it has been propoſed to do the operation by ligature.

Cauſtic applications, however, ſhould here be conſidered as inapplicable, from the impoſſibility of uſing them without injury to the neighbouring parts; and we are debarred from the uſe of the knife and ſciſſors by the profuſe hemorrhagies which have ſometimes occurred from exciſion. Neceſſity therefore obliges us to have recourſe to the ligature; and with due attention we are able to remove every tumor by this method to which the amygdalæ are liable.

In the preceding ſection we have given a particular detail of the beſt method of applying ligatures to polypous excreſcences of the throat, and it likewiſe appears to be the eaſieſt and beſt method of forming ligatures upon tumors of the amygdalæ. It ought to be done with pliable ſilver wire, but catgut of a proper ſtrength will likewiſe anſwer; and although the double canula to be paſſed through the noſe might be of a

ſtraight

ſtraight form, it will anſwer better if it be ſomewhat crooked, as in fig. 2. Plate XLIV.

The double of a ligature, formed of pliable ſilver wire or catgut, being inſerted into one of the noſtrils, muſt be puſhed back till it reaches the throat, when the operator introducing his fingers at the mouth, muſt open the ligature; and having paſſed it over the tumor, it muſt now be preſſed as much as poſſible down to the root of it. He muſt continue to preſerve it in this ſituation with his fingers; while an aſſiſtant having inſerted the two ends of the ligature into the canula, muſt puſh it eaſily along the noſtril, till the farther end of it be either ſeen or felt in the throat; and the wire being now pulled ſo tight as to fix it in the ſubſtance of the tumor, the ends of it hanging out at the other extremity of the canula muſt be tied in the manner we have formerly directed, to the wings or handle of the inſtrument; and the ligature being made tighter from time to time, the ſwelling will ſoon fall off.

The more pendulous the tumor, the more eaſily will the ligature be fixed. But however broad the baſe of it may be, there will ſeldom much difficulty occur with it; for the ſwelling is always very prominent: ſo that when the double of the wire is fairly paſſed over, it may eaſily be puſhed down to the baſe with the fingers; and being preſerved in this ſituation till it is once made ſufficiently tight, it will not afterwards be in any danger of moving.

We have adviſed the ligature to be firſt carried through the noſe before being put over the tumor. It might indeed be inſerted by the mouth; but in this manner much inconvenience would be experienced, from the ligature and canula hanging out at the mouth during the cure. This method, however, may be adopted when any difficulty occurs in the application of the ligature by the mode we have mentioned.

In affections of this nature, both tonſils are in general nearly equally enlarged: In ſome caſes the removal of one of them will form a ſufficient opening for the paſſage of the food; but when it is found neceſſary to extirpate them both, it will be proper to allow any inflammation or tenſion that may have been induced by the firſt, to ſubſide entirely before any attempt is made to remove the other.

This mode of applying ligatures upon theſe tumors, is in my opinion the beſt; but it may often be done in a different manner. Let a ligature of a ſufficient ſtrength be formed of waxed thread; and let this be carried round the tumor either with the fingers or with a ſplit probe, ſuch as is repreſented in Plate XLVI. fig. 3. A nooſe is now to be made upon it, and a knot of any degree of tightneſs may be formed on it by fixing one end of the thread at the ſide of the tumor in the throat with the inſtrument, fig. 2. Plate LI. while the other is firmly drawn with the other hand of the ſurgeon out at the mouth.

This method was firſt put in practice by Mr. Cheſelden; and it has ſince that period been recommended by Mr. Sharpe and others. In order to fix the ligature where the tumor is of a pyramidal form with a broad baſe, a needle with an eye near the point, ſuch as is repreſented in Plate LI. fig. 3. was likewiſe propoſed by Mr. Cheſelden. A double ligature being put into the eye of the needle, the inſtrument is now to be puſhed through the centre of the tumor near to its baſe, and the threads being diſengaged with a pair of forceps, the needle muſt be withdrawn. In this manner two ligatures are to be formed, each of them being made to comprehend one half of the tumor by one of the threads being tied above, and the other below. The inſtrument, fig. 2. of the ſame Plate, is likewiſe neceſſary here.

Although it is proper to mention this method of fixing a ligature upon tumors of the tonſils with broad baſes, it is not probable it will be often neceſſary. By employing the double canula it can never be needed, as by means of it ſuch a degree of force can be applied as will at once fix the ligature in the ſubſtance of the ſwelling: And I am the more confident of this from finding Mr. Sharpe of the ſame opinion, even when the operation was done in a manner by which the ligature could not be ſo firmly fixed as may be done with the double canula; but even when performed in this manner, Mr. Sharpe obſerves, "that he has never in one inſtance found it neceſſary to employ the double ligature recommended by Mr. Cheſelden."*

By whatever method, however, the operation is performed, it may in ſome inſtances happen that the tumor does not fall off by the firſt ligature; in which caſe another muſt be applied, and continued till the cure be completed.

SECTION VII.

Of the Extirpation of the UVULA.

THE uvula, by frequent attacks of inflammation, as likewiſe perhaps by other cauſes, becomes in many inſtances ſo relaxed and elongated as to be productive of much diſtreſs, not only by impeding deglutition, but by irritating the throat ſo as to induce cough, retching, and even vomiting.

Any ſlight degree of enlargement of this part may in general be removed by the frequent uſe of aſtringent gargles, compoſed of ſtrong infuſions of red roſe leaves —of Peruvian bark—or of oak bark, with a due proportion of alum or of the vitriolic acid: And as long as remedies of this kind are found to prove effectual, no other ſhould be adviſed. But when theſe fail, and when the tumefaction of the uvula is ſo conſiderable as to create much uneaſineſs in the throat, along with any of the forementioned ſymptoms, we muſt depend on extirpation alone for the removal of them.

The

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* Vide Mr. Sharpe's Treatiſe on the Operations of Surgery, chap. xxxii.

PLATE XLIX.

FIG. 1.

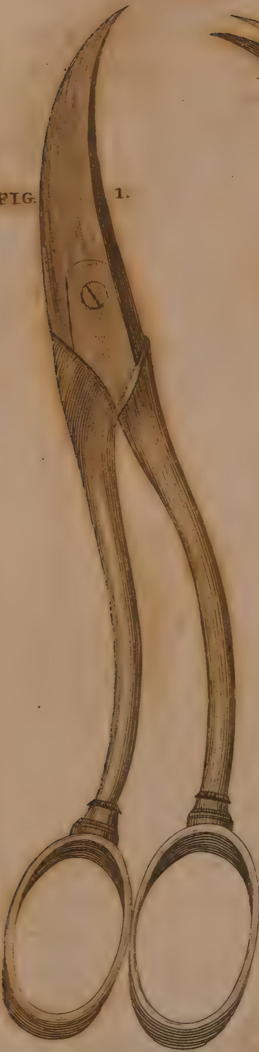


FIG. 2.

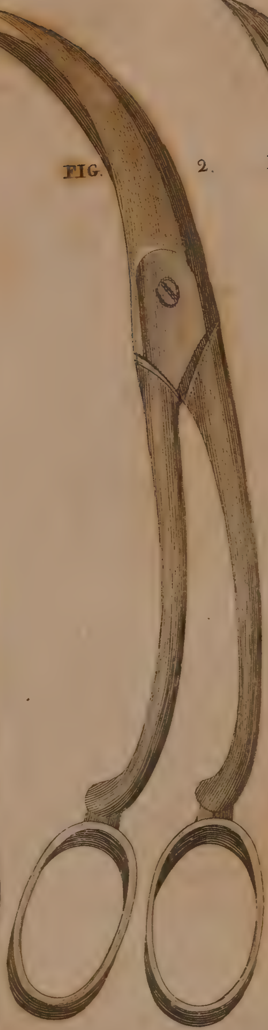


FIG. 3.

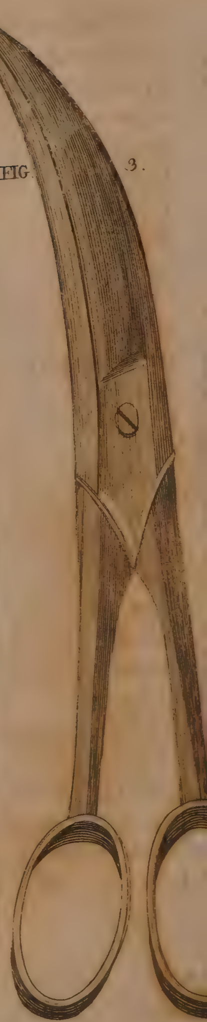
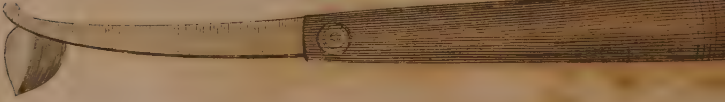


FIG. 4.



The uvula may be extirpated either by exciſion or by ligature. By the firſt, the parts affected are quickly removed, and the patient obtains immediate relief; whereas the other is more ſlow in effecting the ſame purpoſe, and is applied with difficulty. But by exciſion troubleſome hemorrhagies ſometimes occur, while no riſk whatever enſues from the uſe of a ligature. Some practitioners indeed allege that no danger can enſue from any hemorrhagy that may take place in conſequence of the exciſion of the uvula; but although this may in general be the caſe, yet I know from experience that inſtances of the contrary ſometimes occur, and that very conſiderable quantities of blood have been loſt by this operation. This will moſt readily happen where the uvula is much enlarged, and where of conſequence the veſſels with which it is ſupplied are in an enlarged ſtate. Where the uvula is merely elongated, there will ſeldom, I imagine, be any riſk of removing it by inciſion. In this ſtate, therefore, of the diſeaſe, exciſion ſhould be preferred; but when the parts to be removed are much increaſed in bulk, it will be better to make uſe of the ligature.

Different inſtruments have been invented for cutting off the uvula. One of theſe, which has been moſt frequently uſed, is repreſented in Plate LII. fig. 1. But neither this nor any other we have met with anſwers the purpoſe ſo well as a curved probe pointed biſtoury, ſuch as is delineated in fig. 3. of the ſame Plate. Or the operation may be very eaſily done with a pair of ſciſſors of the common form, or with a curve, ſuch as is repreſented in Plate XLIX. fig. 1. 2. or 3.

When any of theſe inſtruments are to be employed, the mouth ſhould be ſecured with a ſpeculum oris, ſuch as is repreſented in Plate LIV. fig. 1; and the uvula ſhould be laid hold of with a pair of ſmall forceps, or with a ſharp hook, by which it will be more eaſily cut off than if it were left hanging looſe in its natural ſituation. After the operation, if much blood be diſcharged, it may be reſtrained by the uſe of an aſtringent gargle; by the application of ardent ſpirits; or even by touching the bleeding veſſel with lunar cauſtic. It will ſeldom happen, however, that any precaution of this kind is neceſſary; for a moderate flow of blood will never do harm, and more than this will rarely occur where the parts are not much enlarged. When, again, the ligature is to be employed, the mode of fixing it deſcribed in the laſt ſection may be adopted: It may be done by the double canula paſſed through one of the noſtrils; or the canula may be introduced at the mouth; or it may be done by the method employed by Mr. Cheſelden for applying ligatures upon the tonſils, which is likewiſe deſcribed in the laſt ſection. After paſſing the ligature round the tumor, which in general will be eaſieſt done with the fingers, a knot may be tied upon it in the manner we have there directed, with the inſtrument, fig. 2. Plate LI.

I have likewiſe thought it right to repreſent another inſtrument, which hitherto has been almoſt the only one employed for fixing a ligature upon the uvula, Plate XLIV. fig. 3. From the name of the inventor, it has commonly been termed the Ring of Hildanus. The invention is very ingenious; and by means of it a ligature may be firmly applied upon the uvula: but the ſame intention may be accompliſhed in a more ſimple manner by either of the other methods deſcribed above; ſo that this will probably be laid aſide.

SECTION VIII.

Of Scarifying and Fomenting the THROAT.

IT frequently happens in inflammatory affections of the amygdalæ and contiguous parts, that ſcarifications are found neceſſary; in the firſt place, for leſſening the degree of inflammation by inducing a topical diſcharge of blood; and afterwards for the diſcharge of matter contained in abſceſſes, when ſuppuration has not been prevented by the means uſually employed for this purpoſe.

In Vol. II. Plate XXIV. I have delineated an inſtrument for this purpoſe; and other two of different forms are repreſented in Plate LIII. figures 1 and 3. The wings with which fig. 1. is furniſhed are particularly well adapted for compreſſing the tongue, while the ſcarificator is employed in the back part of the mouth. By either of theſe, as well as with the other, in Plate XXIV. ſcarifications may be made, or abſceſſes may be opened, in any part of the mouth or throat with perfect ſafety.

In the treatment of inflammatory affections of theſe parts, we often find it neceſſary to recommend fomentations; a remedy, too, which proves frequently highly ſerviceable in catarrhal affections of the trachea and lungs. Various methods are propoſed for conveying warm ſteams to theſe parts; but the beſt we have ever ſeen, and it is likewiſe the neateſt and moſt ſimple in its conſtruction, is the inſtrument delineated in Plate LIII. fig. 2. the invention of Mr. Mudge, of Plymouth. By means of it, the throat, trachea, and lungs, may be very effectually fomented by drawing warm ſteams into them, and without any difficulty or inconvenience to the patient, who may lie in bed during the whole operation. This inſtrument I conſider as ſo highly uſeful in the treatment of every caſe of catarrh, that I think every family ſhould be poſſeſſed of it.

CHAPTER XXIX.

Of DISEASES *of the* LIPS.

SECTION I.

Of the HARE LIP.

NATURAL deficiencies are not ſo frequently met with in any part of the body as in the lips. Children are often born with fiſſures in one of the lips, particularly in the upper lip. In ſome inſtances this is attended with a conſiderable want or real deficiency of parts; in others we only meet with a ſimple fiſſure or diviſion of them; whilſt in ſome again, there is a double fiſſure with an intermediate ſpace left entire between them. Every degree of this affection is termed a Hare lip, from a reſemblance it is ſuppoſed to bear to the lip of a hare.

For the moſt part this fiſſure or opening is confined to the lip itſelf: but in many inſtances it extends backward along the whole courſe of the palate, through the velum pendulum and uvula into the throat; and in ſome of theſe the bones of the palate are either altogether or in part wanting, while in others they are only divided or ſeparated from one another.

Every degree of the hare lip is attended with much deformity. It ſometimes prevents a child from ſucking. When in the under lip, which is not, however, often met with, it is commonly attended with inability to retain the ſaliva, and it is always productive of ſome degree of impediment of the ſpeech; and when the diviſion extends along the bones of the palate, the patient is much incommoded both in chewing and ſwallowing, by the food paſſing readily up to the noſe.

Theſe are all very urgent reaſons for our attempting a cure of this affection as early as poſſible. Indeed, when ſucking is interrupted by it, the child muſt either be fed by the ſpoon, or the operation muſt be done immediately. By practitioners in general we are deſired at all events to delay it to the third, fourth, or fifth year; on the ſuppoſition, that the crying of the child will either render it altogether impracticable, or that the means employed for obtaining a cure will be thereby rendered abortive.

This reaſon, however, does not appear to be of much importance; for till thechild arrives at his twelfth or fourteenth year, when we may ſuppoſe him to be poſſeſſed of ſufficient fortitude for ſubmitting eaſily to the operation, the ſame objection will be found to hold equally ſtrong: Nay, a child of ſix or eight years of age is in every reſpect more difficult to manage than one of ſix, eight, or twelve months. I am therefore clearly of opinion, that in a healthy child the operation ſhould never be long delayed; for the more early it is performed, the ſooner will all the inconveniencies produced by the diſeaſe be obviated; and ſo far as I can judge from my own experience, I think that it may be done even in very early periods of infancy, perhaps in the third or fourth month, with the ſame proſpect of ſucceſs as in any period of life. I have done it in the third month with very complete ſucceſs.

Practitioners all agree with reſpect to the intention of this operation, which is accompliſhed by cutting off the ſides of the fiſſure ſo as to reduce it to the ſtate of a recent wound through the whole extent of it; and this being done, the ſides of the newly divided parts are drawn together and retained in contact till a firm adheſion takes place between them. But although the principles on which our practice is founded are univerſally admitted, authors have entertained very oppoſite opinions of the beſt method of carrying it into execution. By ſome we are directed to employ the interrupted-ſuture for retaining the ſides of the fiſſure; others prefer the twiſted ſuture; whilſt by many, ſutures of every kind are ſaid to be improper; and that a cure may be always obtained by the uſe of adheſive plaſters, or by proper bandages; by which means a great deal of pain, they allege, may be prevented, which ſutures are always ſure to occaſion.

This is a point of much importance, and therefore merits particular diſcuſſion; and more eſpecially as it has been warmly conteſted even by ſurgeons of reputation.

In the treatment of every diſorder, it is our principal object to obtain an effectual cure; but every practitioner will allow, that the eaſieſt mode of effecting this, ought always to be preferred. On this principle much pains have been taken to ſhow, that ſutures are ſeldom neceſſary in wounds of any kind, eſpecially in the treatment of the hare lip; and in ſupport of this opinion various caſes are recited of cures being effected with bandages alone: Nay ſome have gone ſo far as to aſſert, that in every inſtance of a hare lip a cure may be accompliſhed with more certainty by means of a proper bandage than when ſutures are employed; for they allege, that the irritation produced by ſutures ſerves in a great meaſure to counteract the very purpoſe for which they are intended. After the edges of the fiſſure are cut off or rendered raw, the contraction of the adjoining muſcles is the only difficulty which we have to encounter: and this, we are told, inſtead of being removed by ſutures, is univerſally increaſed by them; while the ſame intention, it is ſaid, may be effectually accompliſhed without any inconvenience whatever, by a bandage applied in ſuch a manner as to keep the parts intended to be united in cloſe contact, which it does by ſupporting the contiguous parts

ſo

PLATE I.

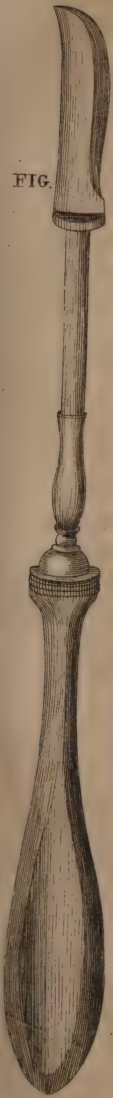


FIG. 1.

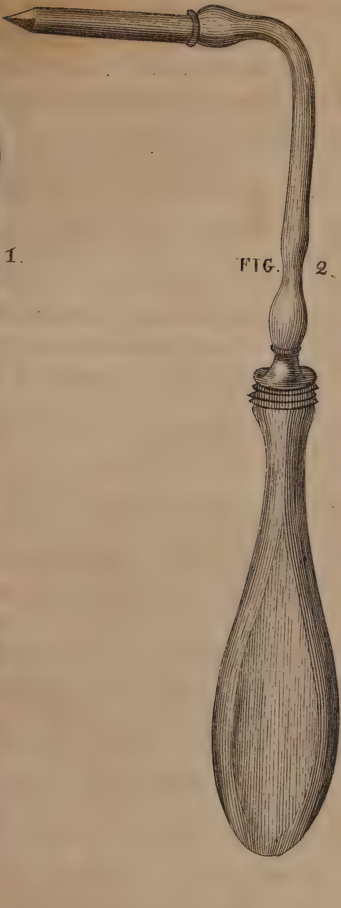


FIG. 2.

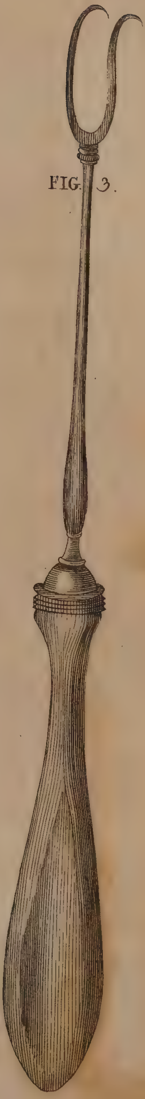


FIG. 3.

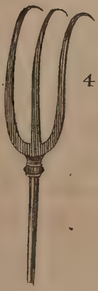


FIG. 4.

ſo as to prevent the reaction of the muſcles connected with them.

That a hare lip may be as completely cured with the uniting bandage, or with adheſive plaſters properly applied, as by ſutures, we have no reaſon to doubt; and as this method of treatment is attended with leſs pain than the other, it ought in every caſe to be preferred if it could be relied on with equal certainty: But although by this means we might with much pains and attention be able in many inſtances to accompliſh a cure, yet from the nature of the remedy there is much reaſon to imagine that it would frequently fail; for in the cure of the hare lip, if every point of the parts intended to be united be not kept in cloſe contact till a complete adheſion takes place, our intention is always fruſtrated, and nothing will afterwards prove ſucceſsful but a repetition of the operation in all its parts. The edges of the ſore muſt be again rendered raw, and the patient muſt ſubmit either to another application of the bandage, or to the uſe of ſutures; which, if employed at firſt, might have ſaved much trouble both to himſelf and to the operator: For it is proper to obſerve, that in caſes where the operation is applicable, the method of cure by ſutures, when rightly conducted, never fails, at leaſt I have never known an inſtance of it. It ſometimes happens, indeed, that the deficiency or retraction of parts is ſo great as to render it impoſſible by any means to keep them in contact; and if ſutures are employed in caſes of this kind, they will no doubt prove unſucceſsful: This, however, is not the fault of the remedy, but of the operator, in uſing it in an incurable variety of the diſeaſe.

As I have had often occaſion to put this operation in practice, and being at firſt prepoſſeſſed in favour of the method of cure by bandages and plaſters, I gave them both a fair trial; and the reſult was what I have mentioned. I found, that by this method a complete cure might in ſome inſtances be obtained, but that the greateſt care and attention could not inſure ſucceſs; and finding that diſappointments never occur from the uſe of ſutures when they are properly employed, I have now laid every other method aſide; and hitherto I have had no cauſe to regret my having done ſo. I ſhall therefore proceed to deſcribe the operation as it is performed when ſutures are employed; and as none of the methods of treatment by bandages will ever probably be received into general uſe, it would be conſidered as ſuperfluous to give an account of them: And beſides, our doing ſo ſeems to be altogether unneceſſary, as the ſubject has already been fully treated of by various authors of reputation, particularly by Monſieur Louis of Paris, who has given a paper in the 4th Volume of the Memoires of the Royal Academy of Surgery, which contains every argument that has been ſuggeſted in favour of the method of curing the hare lip by means of bandages.

In proceeding to the operation, the patient, if an adult, ſhould be ſeated oppoſite to the light, with his head properly ſupported by an aſſiſtant; but if a child, he will be more firmly ſecured if laid upon a table, and kept in a proper poſture by an aſſiſtant ſtanding on each ſide.

The operator is now to make an attentive examination, not only of the parts to be removed, but of thoſe to which they are contiguous. The upper lip ought to be completely ſeparated from the gums beneath, by dividing the frenum which conjoins them. This admits of the lip being more equally ſtretched; and when one of the fore-teeth is found oppoſite to the fiſſure, if it projects in any degree, as is ſometimes the caſe, it ought to be taken out, as it will irritate and ſtretch the parts if it be allowed to remain. In ſome inſtances too, eſpecially when the fiſſure runs through the bones of the palate, a ſmall portion or corner of bone is found to project from one or both of the angles. This ſhould likewiſe be removed; and it may be eaſily done by the pliers or forceps, which ought to be

PLATE LI.

FIG. 1.

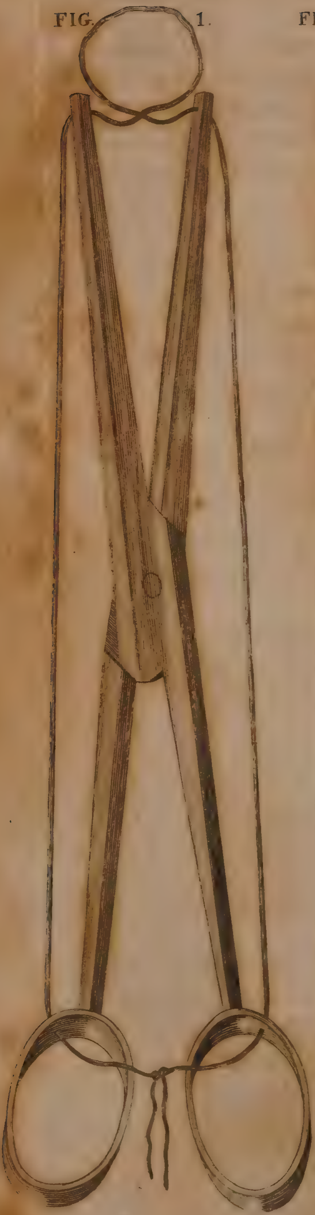


FIG. 2.

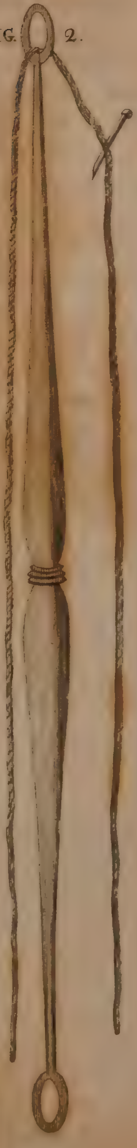
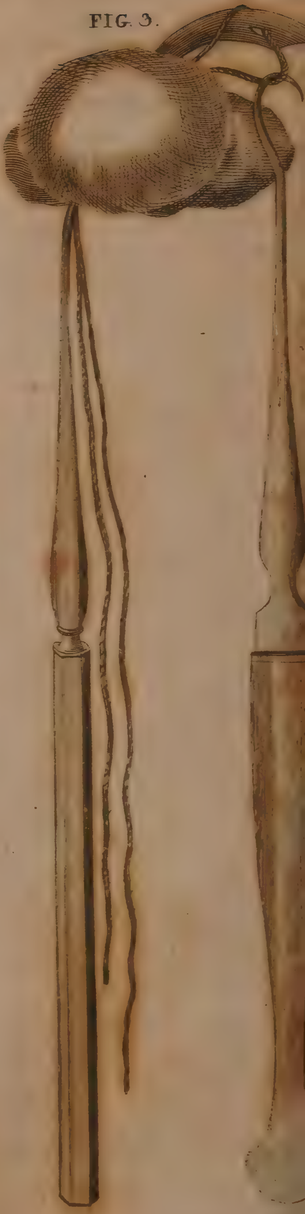


FIG. 3.



both firm and ſharp, as is repreſented in Plate LVI. fig. 2.

These preparatory ſteps being adjuſted, the ſurgeon, ſtanding on one ſide of the patient, muſt take one ſide of the lip between the thumb and fore finger of his left hand; and deſiring an aſſiſtant to do the ſame with the oppoſite ſide, and to ſtretch it ſomewhat tightly, he muſt, with a common ſcalpel, make an inciſion from the under boarder of the lip up to the ſuperior part of it; in which he muſt take care to include not only all the parts immediately concerned in the fiſſure, but even a ſmall portion of the contiguous ſound ſkin and parts beneath. And this being done on one ſide, a ſimilar inciſion muſt be made on the oppoſite ſide; which ought to be of the ſame length with the other, terminating in the ſame point in the upper part of the lip. By this means, if the operation is rightly done, a piece, including the fiſſure completely, will be cut out, of the form of the letter V inverted; and the deficiency will in every part of it have the appearance of a recent wound.

With a view to prevent inflammation, the divided arteries ſhould be allowed to diſcharge freely, eſpecially if the patient is plethoric; and this being done, the ſurgeon is to proceed to unite the ſides of the fiſſure. In this he will be much aſſiſted by deſiring the cheeks to be puſhed forward ſo as to bring the edges of the wound nearly into contact, although not altogether ſo cloſe as to prevent him from ſeeing freely through from one ſide of it to the other; the aſſiſtant behind being directed to ſupport the parts in this ſituation during the remaining ſteps of the operation.

The ſurgeon is now to ſee that the two ſides of the cut correſpond exactly with each other; and this being done, the pins intended to ſupport them muſt be introduced in the manner we have directed in deſcribing the twiſted ſuture, Vol. I. Chap. I. Sect. V. The firſt pin ought to be near to the under edge of the lip: If poſſible indeed, it ſhould be placed entirely within the red part of the lip, leaving no more ſpace beneath than is merely neceſſary to ſupport it. Another pin muſt be inſerted in the centre of the cut, and a third within a very little of the ſuperior angle of it. By ſome we are adviſed to uſe a greater number of pins; but even in adults three are always ſufficient, and in infants two will very commonly anſwer. In paſſing them they ought to be made to enter nearly half an inch from the edge of the ſore; and being carried nearly to the bottom, which will be ſeen by retaining the wound open in the manner we have directed, they muſt be again paſſed outward in a ſimilar direction and to an equal diſtance on the oppoſite ſide of the fiſſure.

The aſſiſtant ſhould be now deſired to puſh forward the cheeks, ſo as to bring the edges of the ſore cloſe together, when a firm waxed ligature ſhould be applied over the pins in the manner we have formerly directed for the twiſted ſuture, and as will perhaps be better underſtood by fig. 3. Plate LVII. The ſurgeon ſhould firſt apply the ligature to the under pin; and having made three or four turns with it, ſo as to deſcribe the figure of 8, it ſhould then be carried to the contiguous pin; and being in a ſimilar manner carried round this pin, he is then to finiſh the operation by carrying it to the other; taking care in applying it round all of them, to draw it of ſuch a tightneſs as may retain the parts in cloſe contact; but not ſo ſtrait as to irritate or inflame them, as is ſometimes done.

By ſome authors we are deſired to make uſe of a ſeparate thread for every pin, in order, as they ſay, to admit of one pin being removed, if it ſhould become neceſſary, without diſturbing the others. This, however, never happens to be the caſe; ſo that the precaution is altogether unneceſſary.

A piece of lint, covered with mucilage to retain it, ſhould now be put over the courſe of the cut, with a view to protect it more effectually from the air; and it ſhould likewiſe be made to cover the ends of the pins to prevent them from being entangled with the bed

clothes,

PLATE LII.

FIG. 1.

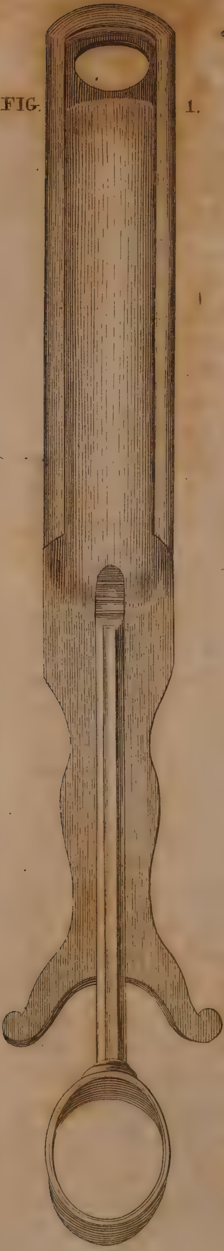


FIG. 2.

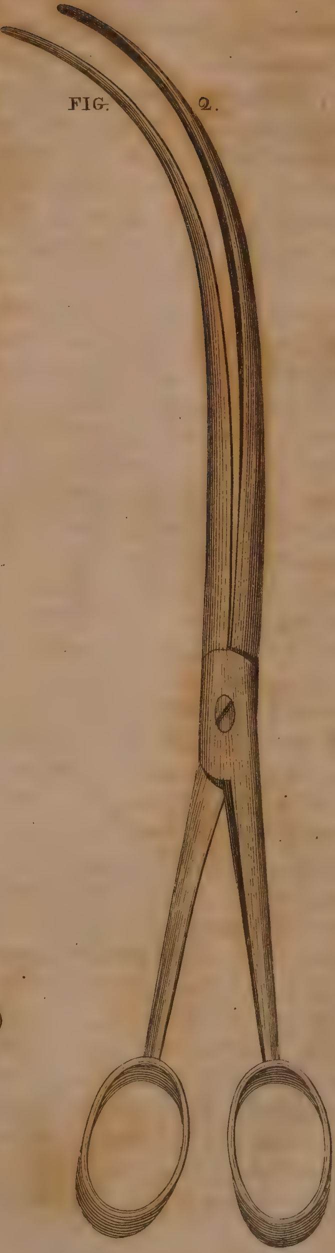


FIG.

clothes, or otherwiſe ; and this is all the dreſſing or bandage which in general is neceſſary. We are deſired indeed by many, after the pins are all ſecured, to apply the uniting bandage, in order to ſupport the muſcles of the cheek, ſo as to prevent the pins from cutting or irritating the parts through which they are paſſed, which they are apt in ſome degree to do, when the deficiency of parts produced by the diſeaſe is conſiderable.

This however, is a practice which I have never obſerved any advantage ariſe from, and it often does miſchief ; for a bandage cannot be applied with ſuch tightneſs as to give any ſupport to the muſcles of the cheek without incommoding the patient exceedingly : and it is apt to do harm, as we have elſewhere obſerved, by preſſing upon the ends of the pins over which it muſt paſs ; for even allowing a ſlit to be made in that part of the bandage correſponding to the lip, as ſome have adviſed, this inconvenience of its preſſing upon the pins cannot be altogether prevented : And beſides, although a bandage may be applied ſufficiently tight at firſt, the motion of the jaw commonly looſens it ſoon, ſo as to prevent it from having any farther effect. When, however, there is a great deficiency of parts, and when the edges of the ſore are with difficulty brought together, ſome advantage may be derived from a proper application of adheſive plaſters. An oblong piece of leather, ſpread either with common glue, or with ſtrong mucilage, ſuch as is employed in making the court plaſter, being applied over each cheek, and of a ſize ſufficient for reaching from the angle of the jaw to within an inch or thereby of the pins on each ſide, and each piece of leather having three firm ligatures fixed to that end of it next the pins, one at each corner and another in the middle, the cheeks ſhould now be ſupported by an aſſiſtant, when the ligatures ſhould be tied ſo as to retain the parts in this ſituation ; and if care be taken to make the ligatures paſs between the pins, and not immediately over them, no harm or inconvenience will occur from them. It rarely happens, however

ever that any aſſiſtance of this kind is needed; for I have, in almoſt every inſtance, found that the pins anſwer extremely well without any ſupport whatever.

It is ſcarcely neceſſary to obſerve, that during the time the pins are in the lip, the patient ſhould be fed upon ſpoon meat, and ſhould be prevented from laughing, crying, or from ſtretching his mouth in any manner of way.

The pins having remained in the lip for five or ſix days at fartheſt, they ſhould now be taken out; for by this time, as I have found by experience, the moſt perfect union of the parts is produced; and by remaining longer they are apt to leave marks which do not ſo readily diſappear as when they are taken out ſooner. I believe, indeed, that three days would frequently prove ſufficient; but as I know from experience that the pins may without detriment, be allowed to remain in the ſore for five or ſix days, I think it better not to remove them ſooner.

This is the practice we wiſh to adviſe for a common caſe of hare lip; and, as a farther illuſtration of it, ſome figures are delineated in Plate LVII. repreſenting the appearance of the diſeaſe before the operation—the parts which ought to be removed—the application of the pins—and the appearance which the parts ſhould have when the operation is finiſhed. But for a more particular account of theſe, we muſt refer to the explanation of the Plate.

What we have hitherto been ſaying relates to the diſeaſe in its moſt ordinary form. In the caſe of a double hare lip, there is a neceſſity for performing the operation twice in all its parts; firſt in one fiſſure and then in the other. By ſome we are directed to do them both at once: but this ought by no means to be attempted; for by doing ſo we incur much riſk of loſing all the advantage that may be derived from the intermediate ſound parts, and of which I once met with a very diſagreeable inſtance. The ſound part of the lip lying between the two fiſſures was by no means inconſiderable,

ſiderable, but being much ſtretched with a great number of pins paſſed through it, it began to inflame immediately after the operation; and the inflammation and pain increaſing, the whole pins were obliged to be removed, and the patient would not afterwards ſubmit to any farther trial. We ought, therefore, firſt to complete the cure of one fiſſure; and this being done, we may in the ſpace of two or three weeks venture with much ſafety on the other.

In deſcribing this operation, we have deſired, that although the fiſſure may not extend the whole breadth of the lip, yet that the cut ſhould paſs up to the upper part of it: And any perſon accuſtomed to this operation will know, that the parts may be united much more neatly in this manner, than when the lip is only cut through part of its breadth. By the one method of treatment, the parts when drawn together are ſmooth and equal; but by the other, they are apt to be uneven and much puckered.

We have alſo deſired that the ſurgeon ſhould take particular care to make the two ſides of the cut exactly of an equal length: a point of much importance in this operation, and requires more attention than is commonly paid to it; for it is obvious, if one ſide of the wound be longer than the other, that the cicatrix will not be ſmooth and even as it ought to be: by inſerting the firſt pin at the edge of the lip, this part of it will be very properly united, but the reſt of it will have a very diſagreeable appearance. The moſt effectual method of guarding againſt ſuch an occurrence is the marking with ſmall dots of ink, not only the length of the cut on each ſide, but the direction which it ought to take, by which every chance of going wrong is prevented.

It is of much importance to have the lip equally and tightly ſtretched in making the inciſion, otherwiſe the edges of the ſore will be ragged and uneven: This may be always prevented by proper attention; but with a view to guard againſt it as much as poſſible, curved forceps may be employed for laying hold of the lip. They are delineated in Plate LV. fig. 1. They ſhould be made ſo as to compreſs the lip equally; and being applied in the direction intended for the inciſion, the ſcalpel ſhould be carried along the ſide of them, by which means the cut may be made very exact and even. Various forms of this inſtrument have been recommended; but the one we have delineated is of a more ſimple conſtruction, and anſwers the purpoſe equally well, if not better, than any of them.

By ſome we are deſired not to employ any inſtrument of this kind, on the idea of its irritating and bruiſing the lip. This ſuſpicion, however, can have occurred only to thoſe who have never uſed it; for when it is ſmooth and equal in every part, a degree of compreſſion may be employed with it perfectly ſufficient for fixing the lip without creating the leaſt uneaſineſs to the patient. This I can aſſert from much experience of its utility.

Inſtead of making the inciſion in this manner, ſome have directed it to be done by fitting a piece of paſteboard, lead, or tin, to the gums beneath; and the lip being placed upon it, to cut down with a ſcalpel upon the ſupporting ſubſtance: The operation may be very properly done in this manner, but the cut is more eaſily made in the manner we have directed.

Till of late the inciſion in this operation was commonly made with ſciſſors; and although they are now very generally laid aſide on the ſuppoſition of their bruiſing the lip, yet the operation may be very properly done with them. I would not think it right to employ ſciſſors to cut a part of much thickneſs, but the lip is ſeldom ſo thick as to render it improper to uſe them in cutting for the hare lip. They have of late been uſed in this place by different practitioners; and as a point of this kind can be determined by experience alone, I have likewiſe employed them. In

PLATE LIII.

FIG. 1.

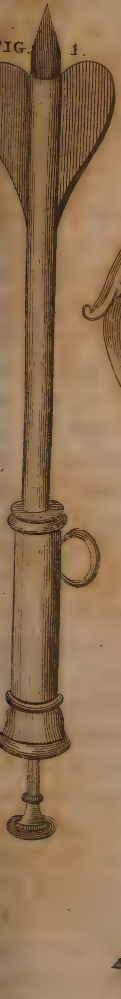


FIG. 2.

FIG. 3.

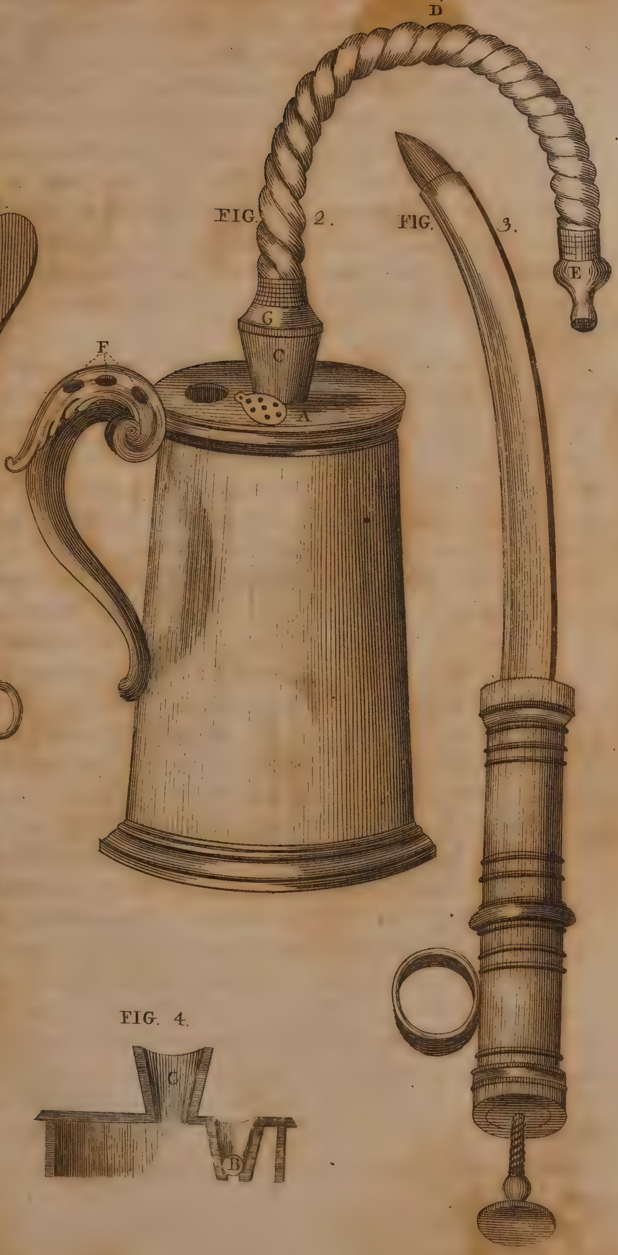


FIG. 4.

order to aſcertain which of the two modes of operating, that with the ſcalpel or with the ſciſſors, ought to be preferred, I in one caſe made the inciſion in one ſide with a ſcalpel, and in the other with ſciſſors. The patient averred that the ſciſſors gave leaſt pain, probably from their making the cut in ſomewhat leſs time than is neceſſary with the knife; and, during the cure, that ſide of the lip which was cut with the ſciſſors neither ſwelled nor inflamed more than the other. I do not from this, however, mean to ſay, that ſciſſors are preferable to the ſcalpel; I mention it only to ſhow that the common idea entertained of them is ill founded, and that the operation may be equally well done with both inſtruments. Sciſſors for this purpoſe ſhould be very ſtrong, and particularly firm at the joint. They ought alſo to be highly poliſhed. The ſize and form of them repreſented in Plate LVI. fig. 1. has been frequently uſed, and is found to anſwer.

When deſcribing the Twiſted Suture in Vol. 1. I gave the preference to gold pins; and I am ſtill of opinion that they are the beſt. When of a proper form, ſuch as are repreſented in Plate II. figs. 2. 3. and 4. they pierce the lip with much eaſe without any aſſiſtance from a porte-aguille: but they who think that a ſharper and firmer point than can be given to gold will anſwer better, may have ſteel points added to them as is repreſented in Plate LVII. and the ſteel points being moveable, they may be removed after the pins are paſſed, by which every riſk is prevented of their wounding the contiguous parts. By ſome practitioners, flexible needles are employed for this operation; but they have not been found to anſwer ſo well as thoſe which are firm and give ſufficient reſiſtance to the ligatures.

In paſſing the needles, I have ſaid that they ſhould go nearly through to the oppoſite ſide of the lip: This ought to be particularly attended to, otherwiſe a fiſſure will remain in the inner part of the lip, which may afterwards prove troubleſome by the food lodging in it.

And beſides, although the diſcharge of blood which ſucceeds to this operation is always ſtopt immediately on the parts being drawn together by the ligatures where the pins have been properly introduced, yet when they are not paſſed to a ſufficient depth, the blood will continue to get out behind, and may afterwards be productive of much diſtreſs. I have ſeen an inſtance of this where a very troubleſome oozing of blood continued for ſeveral days after the operation; and an inſtance is recorded even of death enſuing from it. In order to prevent the lip from being ſtretched by the patient ſpitting, it is the uſual practice to deſire him to ſwallow his ſaliva with any blood that may be diſcharged from the ſore. In this caſe the patient complied implicitly with the directions given to him; and he died from the cauſe I have mentioned, namely, a great loſs of blood. His ſtomach and bowels were found filled with blood which he had ſwallowed.*

There being the leaſt chance of ſuch an occurrence, ſhould be a ſufficient reaſon for patients being prevented from ſwallowing their ſpittle after this operation, till it is obſerved that there is no blood mixed with it; but beſides, it ſometimes happens, that ſickneſs and vomiting is induced even by a very ſmall quantity of blood paſſing into the ſtomach, by which the lip is much more ſtretched than it would be by all the blood from the wound being ſpit out.

We have thus deſcribed all the ſteps of the operation for the hare lip: and it is proper to obſerve, that they are equally applicable in the treatment of a fiſſure in the lip by whatever cauſe it may be formed; only, in a recent cut, as the edges of it are already raw, all that the ſurgeon has to do is to inſert the pins and apply the ligatures. In wounds where ſuppuration has already commenced, there is uſually ſome degree of inflammation upon the edges of them: While this continues it would be improper to draw them together by ligatures; but as ſoon as the inflammation ſubſides, we may with much propriety inſert the pins and finiſh the operation in the manner we have directed. We are told indeed by many, that this practice will ſucceed only in recent wounds, and that it ought not to be recommended where matter is already formed: I have often, however, acted otherwiſe: and I have uniformly found, where the edges of a ſore have not become callous, that they have been united as eaſily when covered with pus as when perfectly recent and covered with blood.

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* Vide Memoires de l'Academie Royalle de Chirurgie, Tom. IV. page 427.

In caſes of hare lip attended with a fiſſure in the bones of the palate, after uniting the ſoft parts in the manner we have pointed out, ſome advantage may be derived from a thin plate of gold or ſilver, exactly fitted to the arch of the palate, and fixed in by a piece of ſponge ſtitched to the convex ſide of it to be inſerted into the fiſſure. If the ſponge be inſerted dry, and be properly fitted, the moiſture which it imbibes from the contiguous parts will in many inſtances make it remain ſufficiently firm, by which both ſpeech and deglutition will be rendered more eaſy. In ſome caſes, however, the form of the fiſſure is ſuch as prevents the ſponge from having any effect. This always happens when the opening is wider outwardly than it is found to be more internally. For ſuch caſes other means have been propoſed, eſpecially thin plates with gold ſprings, made ſo as to fix upon the contiguous parts; but no invention of this kind has been yet found to ſucceed.

SECTION II.

Of the Extirpation of CANCEROUS LIPS.

THE under lip is more frequently attacked with cancer than any other part of the body; and as we know of no internal remedy by which the diſeaſe can be cured, the only means we employ for it is the removal of the part affected. In a former publication, we endeavoured to ſhow, that little dependence can be placed either on arſenic or any of the cauſtic applications, which have been ſo much recommended for this purpoſe; and that we are to truſt to the ſcalpel alone for relief.

When a cancerous ſore has ſpread over any conſiderable part of the lip, and eſpecially when the lip is altogether affected, all that a ſurgeon can do is to remove the diſeaſed parts; to ſecure the divided arteries by ligatures, when this is found neceſſary; and to dreſs the ſore as a recent wound from any other cauſe. In this manner a cancer may be effectually taken away; but it gives a very diſagreeable appearance, the under teeth and gums being left all uncovered; and the patient can neither retain his ſaliva, nor ſwallow liquids, but with much difficulty. There is here however, no alternative; for where the whole lip is taken away, the inconveniences we have mentioned muſt neceſſarily enſue, as there is no poſſibility of drawing the divided parts together.

But when the diſeaſe has not attacked any conſiderable part of the lip, we may always have it in our power to draw the edges of the cut together ſo as to make them unite with the twiſted ſuture in the manner deſcribed in the laſt ſection: by which we not only prevent a great deformity, but the patient is equally capable as he was before the operation, of ſwallowing liquids and retaining his ſaliva: And beſides, this method of treatment, as we have elſewhere remarked, by leaving a very ſmall extent of cicatrix, ſeems to have ſome effect in preventing a return of the diſeaſe; at leaſt this has been evidently the caſe with thoſe that have fallen under my obſervation. Where the operation has been performed in the uſual way, without drawing the divided parts together and uniting them by ligatures, the diſeaſe has in ſeveral inſtances returned: But, excepting in a very few unfavourable caſes, it has never returned where the hare lip method of treatment has been employed. Nay more, this will ſometimes ſucceed where the other has failed. A man appeared at our Infirmary here with a cancer on the under lip. It had been twice removed by extirpation in the uſual way; but the diſeaſe returned after each operation ſoon after the healing of the ſore. As there was not ſo much of the lip removed as to prevent the ſore from being treated in the manner we have directed, after taking away all the diſeaſed parts, this method was accordingly put in practice. The cure was completed; and I had an opportunity of knowing, eight years after the operation, that the man remained in good health, without any return of his diſeaſe. Nor ſhould we be deterred from doing the operation in this manner by the diſeaſe being extenſive, if we find that the parts which have been divided can be drawn together and retained by the twiſted ſuture: And this, we may remark, may be always done where the diſeaſe does not render it neceſſary to remove almoſt the whole lip. Theſe parts ſtretch ſo conſiderably, that in general this method of treatment may be adopted, although a third part only of the lip is left after the operation. With reſpect to the method of doing the operation, we muſt refer to the laſt ſection. In addition to what was then ſaid, we have to obſerve, that all the cancerous parts ought in the firſt place to be removed, taking care to form the cut in ſuch a manner as will moſt readily admit of the edges of it being eaſily and neatly drawn together. When the diſeaſe is ſeated in the lip only, the parts will have nearly the ſame appearance after this operation, as they have after that for the hare lip. But when the diſorder extends to the cheek, as is ſometimes the caſe, a longitudinal diviſion of the lip will not only be neceſſary, but a tranſverſe cut into the cheek; both to be united by pins and ligatures: an operation which in different inſtances I have put in practice with very complete ſucceſs.

CHAPTER XXX.

Of the DISEASES *of the* MOUTH.

SECTION I.

Anatomical Remarks.

BEFORE we proceed to conſider the diſeaſes which are the object of the preſent chapter, it will be proper to premiſe a ſhort anatomical deſcription of the teeth, gums, and jaws, the parts in which theſe diſeaſes are chiefly ſeated.

On examining a tooth, we find it divided into three parts; that part of it which lies above the gums, termed the Body or Corona of the tooth: the roots or fangs, which the gums, in a ſtate of health, cover entirely. And a kind of depreſſion between the body and fangs, juſt where the gums commonly terminate: This is termed the Neck of the Tooth.

The root, as well as the interior part of the corona, is compoſed of an oſſeous kind of matter; but it appears to differ from bone by our not being able to throw injections into it: for although we are told that this may be done, there is much reaſon to imagine that the opinion is ill founded, from the beſt anatomiſts having failed in it.*

This oſſeus part of the teeth being of a ſoft texture, would ſoon ſuffer and wear away by maſtication: But nature has amply provided againſt this inconvenience; for we find all that part of them which lies expoſed, by being above the gums, covered by a very firm, hard ſubſtance, termed the Enamel, which protects them effectually againſt every injury of an ordinary nature. This part of a tooth, beſides being much harder than bone, differs from it likewiſe in our not being able to paſs the moſt ſubtle injection into it; nor can it be tinged by feeding an animal upon madder or any other colouring ſubſtance, as is the caſe with every bone in the body. The enamel is thickeſt on the upper ſurface of the teeth, eſpecially in the grinders where it is moſt needed; and it becomes gradually thinner as it approaches the neck, where it terminates. At this part we find the commencement of the perioſteum, which covers all the roots of the teeth, and is intimately connected both with them and with the ſurrounding ſockets.

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* Vide the Natural Hiſtory of the Human Teeth, by John Hunter, 2d edition, p. 36, &c.

In the interior part of every tooth we diſcover a hollow, or cavity, correſponding to the ſize and figure of the tooth itſelf. It commences by a very ſmall opening in the extremity of the root or fang, at which the blood veſſels and nerves of the tooth enter; and this canal becoming wider as it proceeds forwards, terminates at laſt in the body of the tooth, where we find the cavity filled with a pulpy kind of ſubſtance, probably formed by an expanſion of the blood veſſels and nerves belonging to it. A tooth with one root or fang has commonly only one hole or opening in it; but ſome teeth have ſeveral fangs, and every fang has a canal paſſing through it, and is ſupplied with diſtinct blood veſſels, and probably with ſeparate branches of nerves, although theſe have never been clearly traced into them.

The teeth are fixed in what is termed the Alveolar Proceſs of each jaw. This conſiſts of a broad thick edge, with which the jaws are furniſhed, divided into ſeparate cells or openings for the fangs of the different teeth; and the roots of the poſterior teeth being larger and more expanded than the others, we find accordingly that this part of the jaw is thicker and broader than the fore part of it. In the upper jaw this difference, with reſpect to thickneſs, is increaſed by the antrum Highmorianum, a large ſinus or cavity in each maxillary bone immediately above the large molares or grinders of each ſide. This ſinus has no communication with the mouth, but it opens into the noſtril between the two oſſa ſpongioſa, by a canal, which in the ſkeleton is large enough to admit a common quill. The alveolar proceſs of the upper jaw is divided from this cavity by a thin plate of bone, in which the roots of the poſterior molares commonly terminate; but in ſome inſtances they paſs through this plate into the antrum itſelf.

The lower jaw is in infancy compoſed of two bones, united at the chin by what is termed the Symphyſis of the jaw. Theſe bones however are ſoon joined ſo firmly together, as to have the appearance of one continued and connected piece. Beſides the alveolar proceſs, the under jaw is on each ſide furniſhed with other two proceſſes, with which it is neceſſary for practitioners to be acquainted. The anterior, which ſeems to be chiefly intended for the inſertion of the temporal muſcle, is termed the Coronoid Proceſs. It ariſes in the form of a ridge from the outſide of the jaw oppoſite to the two poſterior molares; and proceeding backward and upward, it terminates in a thin ſharp point: And the poſterior or condyloid proceſs, which is ſhorter, thicker, and ſtronger than the other, terminates in an oblong head or condyle, by which the articulation is formed between this bone and the head.

The coronoid proceſs gives a degree of ſtrength and thickneſs to the external plate of the alveolar proceſs in this part of the jaw that does not take place in any other part of it. This renders it highly improper to attempt the extraction of the two laſt molares by turning them outwards. They ſhould always be pulled towards the inſide of the mouth. Through all the reſt of the jaw, the ſockets or alveolar proceſſes are weakeſt on the outſide, although the difference is inconſiderable; and they are in both ſides weaker in the upper than in the under jaw.

The full number of teeth in an adult is thirty two; and as they are of different forms, and intended for different purpoſes, they are accordingly diſtinguiſhed by particular names. The four anterior teeth in each jaw are named Inciſores; the next to theſe on each ſide are the Canine; and the five poſterior teeth on each ſide are termed the Molares or Grinders; the two firſt the ſmall molares, and the other three the large grinders.

In childhood there are only twenty or twenty four teeth, which continue till the ſixth or ſeventh year, when they begin to drop, and are ſucceeded by others which are termed the Adult or Permanent teeth. The firſt ſet, or milk teeth, as they are commonly called, as well as ſome of the others, are formed in the jaw before birth; but they do not in general appear above the gums till the child is ſeveral months old. In ſome inſtances, about the fourth or fifth month, but moſt frequently about the eighth or ninth, two of the inciſores appear in the lower jaw. Theſe are commonly ſucceeded by two in the upper jaw, and the other four fore teeth appear afterwards, at uncertain periods, between this and the tenth or twelfth month. About the ſixteenth or ſeventeenth month, four of the large molares appear; for in childhood there are no ſmall molares: One of theſe puſh out on each ſide, leaving a ſpace between them and the inciſores for the canine teeth; which being formed farther up in the jaw, ſeldom appear before the twentieth month: but about this period, or between this and the end of the ſecond year, both they and other four molares have commonly made their appearance.

Theſe are the periods at which the infantine ſet of teeth uſually appear; but much variety is met with in this point. I have known the canine teeth appear before any of the molares. In one inſtance they came forward before two of the inciſores. In ſome caſes the inciſores have been obſerved in the ſecond and third months, nay even at birth; whilſt in others, I have known the fourteenth or fifteenth month paſs over before any have appeared.

Theſe teeth continue firm till the fifth or ſixth year. About this period they begin to looſen; and between the ſeventh and twelfth year they are commonly all ſhed and ſucceeded by others. By this period too, the jaws are ſomewhat lengthened, ſo as to admit of other four molares. Between the twelfth and ſixteenth years four others appear; and in general about the twentieth year the four laſt of the molares appear, uſually named the Dentes Sapientiæ.

The two ſets of teeth we have deſcribed have very different appearances, inſomuch that we may in general know, from the appearance of a tooth, whether it belongs to the infantine or permanent ſet; and as this is often a point of importance, it ought to meet with particular attention. It is particularly neceſſary to be acquainted with their appearances in the treatment of thoſe diſorders of the teeth which occur about the time of ſhedding the firſt ſet: for it frequently happens that we would have no heſitation in pulling a tooth, were we certain that it belonged to the firſt ſet; while we would rather decline to take it out if it appeared to be one of thoſe which ſhould continue during life. It has happened indeed in a few inſtances, that a third ſet of teeth have appeared; but this is a very rare occurrence, and is only to be conſidered as a very unuſual deviation of nature.

The ſockets of the teeth, and a ſmall portion of the teeth themſelves, are covered with a red, firm, fleſhy kind of ſubſtance, termed the Gums. This ſubſtance ſeems to be almoſt entirely vaſcular; for the ſlighteſt wound or ſcratch in it is always attended with a diſcharge of blood. The alveolar proceſs of each jaw is entirely covered with it; ſo that we find a ſmall portion of the gums between every two teeth. In ſome diſeaſes, particularly in the ſcurvy, a partial ſeparation often occurs of the gums from the teeth; but in a healthy ſtate they adhere ſo firmly to the necks of the teeth as to have ſome effect in fixing them in their ſockets.

We ſhall now proceed to treat of the diſeaſes of theſe parts, and of the operations performed upon them.

SECTION II.

Of DENTITION.

DURING the approach of the firſt ſet of teeth, and in ſome inſtances of that of the ſecond, much diſtreſs is frequently experienced from the irritation produced by the teeth upon the gums. For this reaſon I have thought it right, before proceeding to the diſeaſes of the mouth, to offer a few general obſervations on Dentition.

In Dentition the gums inflame and become full about the part where the teeth are afterwards to appear. The child is conſtantly rubbing the gums with his fingers. The ſaliva is for the moſt part increaſed in quantity; but in a few inſtances it is otherwiſe, and the mouth becomes perfectly dry. The bowels are commonly very irregular, the patient being on ſome occaſions extremely coſtive, and on others diſtreſſed with a diarrhœa. The heat of the body becomes increaſed, and quickneſs of pulſe takes place along with other ſymptoms of fever. Theſe are the moſt frequent ſymptoms attending dentition; but it often happens that they are accompanied with ſubſultus tendinum, and even with convulſions.

As theſe ſymptoms originate from irritation, thoſe means are chiefly to be depended on which are moſt effectual in counteracting this. Hence we derive much advantage from opiates, bliſters, and eſpecially from warm bathing. But when theſe fail, which they often do, we have it frequently in our power to remove every ſymptom, by making an inciſion through the gums directly upon the approaching tooth or teeth; an operation uſually termed ſcarifying the gums.

A common prejudice prevails againſt this operation, from an idea of its doing harm, in the event of a cicatrix being left upon the gums, which ſometimes happens when the tooth is not juſt at hand; for it is ſuppoſed that the cicatrix will afterwards be worſe to penetrate than if the gum had not been touched. For this reaſon the operation is ſeldom or never done till the tooth is obſerved to have elevated the gum conſiderably: but in this we are wrong; for when delayed ſo long, almoſt all the advantages which may be derived from it are loſt. I have commonly obſerved, that the very worſt ſymptoms which occur from dentition, take place before the teeth have come this length; and that they uſually abate on the teeth approaching towards the ſurface of the gums, probably from the gums being rendered more inſenſible by the long continued preſſure of the teeth beneath.

Whenever we have reaſon to ſuſpect therefore, from the nature of the ſymptoms, that they are owing to this cauſe, we ought without heſitation to make a free inciſion through that part of the gums where there is moſt reaſon to expect a tooth; and if this inciſion ſhould afterwards heal, and if the ſymptoms ſupervene again, no riſk can occur from the operation being repeated. I have frequently found it neceſſary to cut two or three times upon the ſame tooth; but with a view to prevent the neceſſity of this, I commonly make a crucial inciſion down to the depth of the tooth, and I have never obſerved any inconvenience to occur from it. We have no cauſe whatever to be afraid of hemorrhagy. Indeed the cut ſeldom bleeds above a few drops, and it commonly heals eaſily.

The operation may be done with a common lancet, or with a biſtoury or ſcalpel, the inſtruments uſually employed for it: but it cannot be neatly done with any of them; and beſides, we are in danger, either with a lancet or ſcalpel, of hurting the contiguous parts. The inſtrument repreſented in Plate XLIX. fig. 4. is not liable to any of theſe objections; and being of a ſmall ſize, it may be entirely concealed in the palm of the hand. The child being ſecured by the nurſe, the ſurgeon with the fingers of one hand ſhould open the mouth; and conducting the edge of the inſtrument with the fore finger of the other, the inciſions ſhould be finiſhed before withdrawing it, by making a crucial cut over every tooth that appears to be approaching. The inciſion, as we have already adviſed, ſhould always be carried to the depth of the tooth, ſo as to lay it entirely bare; and when this is freely done, the effects which reſult from it are often remarkable. I have ſeen inſtances of children being inſtantly relieved by this operation who previouſly appeared to be in the moſt imminent danger.

It ſometimes happens too, as we have already obſerved, that diſagreeable ſymptoms take place from the approach of the ſecond ſet of teeth. I have known pain produced over the whole jaw, attended with ſwelling and inflammation of the gums and cheeks, from a ſingle tooth not getting freely out. This happens moſt frequently with the dentes ſapientiæ; in ſome inſtances, from the uſual cauſe of irritation produced upon the gums, which in the back part of the jaws are very thick; but in others from there not being room in the jaw to admit them. In the firſt caſe, we have it commonly in our power to remove all the ſymptoms, by making a free inciſion directly upon the tooth; but in the other this does not always prove ſufficient, and nothing will frequently anſwer but the extraction of the tooth. When it is diſcovered that the ſymptoms originate from this cauſe, we ſhould not heſitate about the removal of the tooth: for it ſeldom happens that any advantage is gained from delaying it, and the inflammation induced upon the gums often ſpreads to the throat and other contiguous parts; and is thus productive of much diſtreſs, which might be eaſily prevented. When the throat inflames and ſwells from this cauſe, no other remedy will prove ſucceſsful; and it is often ſurpriſing how ſoon the moſt violent degree of inflammation is removed by it. I have known inſtances of much diſtreſs in the throat relieved immediately by the removal of a tooth, which had obſtinately reſiſted every other means for ſeveral weeks.

SECTION III.

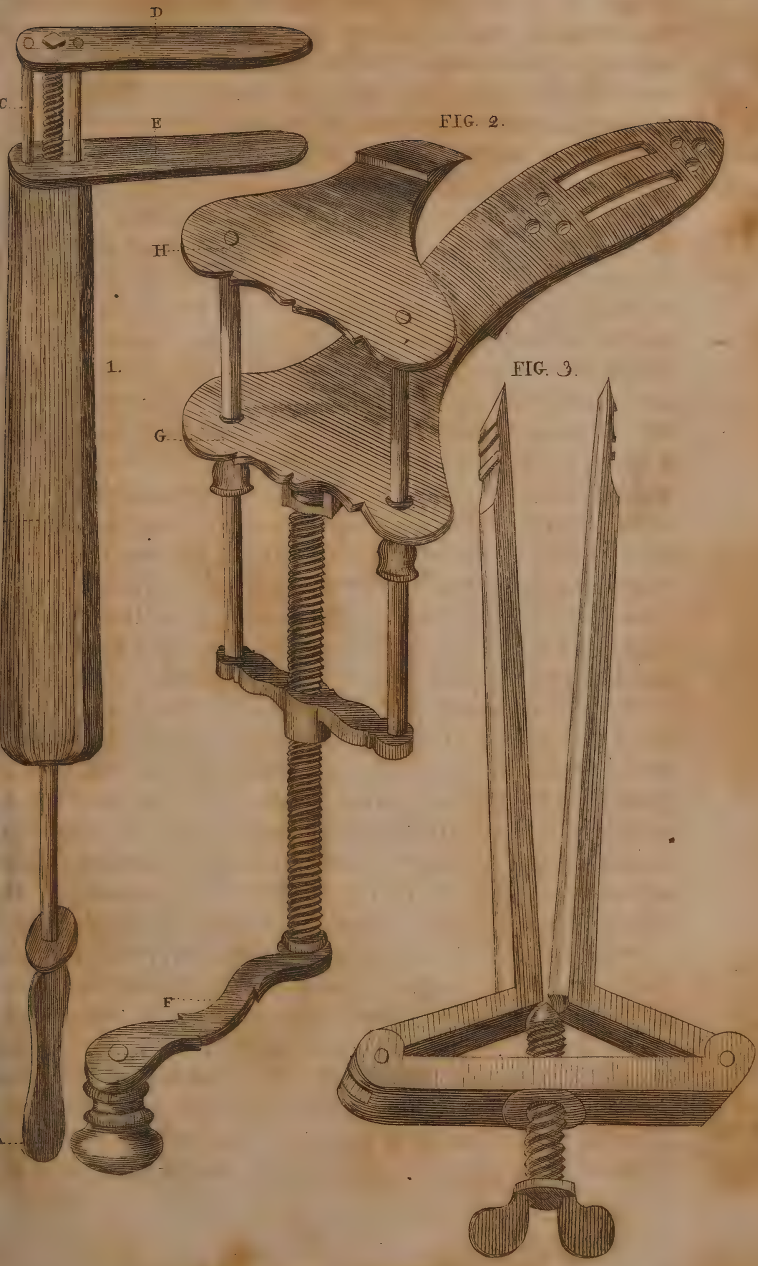
Of the Derangement of the TEETH.

THE ſecond ſet of teeth frequently appear in a very irregular manner: Some of them will be very properly placed, while ſome are farther out upon the jaw, and others farther in, than they ought to be. When the derangement is not very remarkable, it ſeldom meets with much attention; but in ſome inſtances the deformity produced by it is ſo conſiderable as to require the aſſiſtance of art for removing it. It occurs moſt frequently in the inciſores and canine teeth, ſeldom or never in any of the molares.

Derangements of the teeth may occur from different cauſes:—from a deficiency of ſpace in the jaw, by which they cannot be all admitted in one circle;—from a natural mal-conformation;—or from ſome of the firſt ſet remaining firm after the ſecond ſet have appeared.

It will ſometimes happen, that the teeth which are out of the circle will fall into it without any force being applied to them, on ſpace being given to them by one or more of thoſe which are in the circle being pulled. When it appears, therefore, that the derangement is owing to any of the firſt ſet not having dropped, they ought to be taken out immediately; for the longer it is delayed, there will be the leſs chance of the irregular teeth falling into their ſituation : but when it is even owing to thoſe of the ſecond ſet being too large for the ſpace they are to fill, we ſhould not heſitate in removing ſome of them, for no other method will prove ſucceſsful. When the teeth which occupy the natural circle of the jaws are regular and have a good appearance, the tooth or teeth which are out of the circle ought to be pulled ; but when either of the contiguous teeth do not fill the place ſo properly as theſe would do, or when they are rough or otherwiſe of a diſagreeable appearance, it may ſometimes be adviſeable to pull one of theſe that are in the circle, and endeavour to bring the others into the range. If this be done before the teeth have been long fixed, and if they are not far diſtant, they will ſometimes in a gradual manner, as we have ſaid, fall into the vacancy without any aſſiſtance ; but when this does not happen ſoon from an effort of nature alone, we may frequently employ means for promoting it. No attempt, however, of this kind, can be made till the body of the deranged tooth has paſſed freely out from the gums, as till then it cannot be eaſily laid hold of.

The uſual method of moving teeth which are out of the circle, is by applying a ligature round them, and tying each end of it firmly to the contiguous teeth, and pulling it tighter from time to time : or a plate of gold or ſilver is fitted to the contiguous teeth, and made to ſurround the deranged teeth in ſuch a manner, that when it is firmly preſſed down by the oppoſite jaw, it acts with conſiderable force in bringing the teeth nearer together. This laſt method, however, proves troubleſome to the patient ; and the other, at the ſame time that it will in ſome degree move the deranged teeth towards the circle, will nearly in the ſame proportion draw the others out of it ; but we may in another manner apply a ligature for this purpoſe with perfect ſafety, and it is by much the beſt we have yet ſeen of moving deranged teeth. Let a thin plate of gold, PLATE LIV.



gold, of a length ſufficient to paſs over four of the contiguous teeth, be exactly fitted to the ſide of thoſe teeth oppoſite to that which is to be moved. The plate ſhould be perforated with ſeveral ſmall holes: On being applied to the teeth, and tied to them by a bit of waxed thread, let a piece of flexible wire be paſſed through two of the holes; and the doubling of the ligature being carried over the tooth to be moved, the two ends of it ſhould be firmly drawn through the holes, and ſhould now be fixed with a pair of pliers. Every three or four days the ligature ſhould be made ſomewhat tighter; and this being perſevered in, almoſt every tooth in this ſituation may at laſt be brought into the circle.

It ſometimes happens that a good deal of deformity is produced by an opening in the anterior part of the jaw, formed either by one or more teeth being accidentally driven out, or from there being a natural want of them. When a practitioner is called immediately on a tooth being driven out, he ought by all means to replace it; or if the tooth be broke, or otherwiſe much injured, he may conſult the inclination of the patient with reſpect to the tranſplanting of a ſound one from the mouth of another perſon. But in matters of this kind the patient ſeldom complains till the parts affected have become inflamed and tumefied, when it is too late to put this method of treatment in practice. In this ſituation we muſt wait till the pain and ſwelling are entirely removed; when, if more than one tooth is wanting, the deficiency muſt be ſupplied with artificial teeth fixed to thoſe which remain firm; but when one tooth only is wanting, we may frequently, in young people, be able to remove the deformity by paſſing a ligature round the two contiguous teeth, ſo as by degrees to draw them nearer together. Nature will frequently effect this, in ſome degree, of herſelf: but the operation is commonly ſlow; and beſides, it is ſeldom done ſo completely as when a ligature is employed. By this means the bodies of the teeth are equally drawn together; but when the ligature is not uſed, although the teeth, from want of ſupport, will fall nearly together at their points, the opening will commonly remain nearly the ſame at their roots.

SECTION IV.

Of GUM BOILS.

THE gums, like all the ſoft parts of the body, are liable to abſceſſes; but collections of matter occur more frequently in the gums than in other parts, from their being more expoſed to cauſes which tend to produce them. Abſceſſes may in this ſituation originate from cold and from external violence, as well as from every cauſe which tends to produce inflammation in other parts; but they are for the moſt part traced as the conſequence of tooth ach: and they occur not only from carious teeth, but from inflammation at the roots of teeth, when perhaps in every other reſpect the teeth may appear to be ſound.

A gum boil commonly appears after a fit of tooth ach has continued for ſome time. It begins with ſome degree of pain, attended with a ſmall tumor on the part affected. By degrees the cheek ſwells; and this ſwelling frequently ſpreads over the whole face ſo as to produce much deformity. On ſuppuration taking place, the ſmall tumor, which is commonly ſeated on the outſide of the gums exactly oppoſite to the diſeaſed tooth, begins to point; and if it be not opened, it generally burſts either through an opening in the ſide of the gum, or between the gum and the tooth. A quantity of matter is now commonly diſcharged, by which the patient in general receives effectual relief: But as the cauſe ſtill remains, the diſcharge likewiſe continues; for as the diſeaſe is moſt frequently induced by ſome affection of a tooth, or by a portion of the jaw becoming carious, a ſtillicidium of matter uſually continues,

tinues, either till the diſeaſed tooth is removed, or till the carious part of the jaw has exfoliated: Or, if the opening happens to cloſe, the diſeaſe will be ſoon renewed by the ſwelling returning, and again going through all the ſtages of inflammation and ſuppuration in the manner we have already deſcribed. When indeed the diſeaſe is owing merely to inflammation at the root of a tooth, and when the root happens not to be denuded of its perioſteum, after the matter of the abſceſs is evacuated, the ſides of it may collapſe and adhere, and a cure will in this manner take place; But when the diſeaſe is produced either by a carious tooth, or by a carious portion of the jaw, or even when it proceeds from inflammation alone, if the root be laid bare by the matter, the diſeaſe will not be perfectly eradicated till the tooth or carious part of the jaw is removed; for theſe will continue to irritate the contiguous parts in the ſame manner with extraneous bodies of any other kind. In the caſe of a ſpoiled tooth, we ſhould adviſe it to be immediately removed: but when the diſeaſe originates merely from inflammation at the root of a tooth, before pulling it every method of a more ſimple nature ought to be tried; and the ſame means which we employ in the treatment of abſceſſes in other parts ſhould be put in practice here. When a free opening is formed by the burſting of the abſceſs, we may ſometimes be able to dry up the running, by injecting from time to time a little lime water—ardent ſpirits—tincture of myrrh—or tincture of Peruvian bark properly diluted. But although trials of this kind may be adviſeable with timid patients, who will not ſubmit to other means, we can ſeldom place much dependence upon them: The moſt effectual practice is to lay the abſceſs open by an inciſion from one end to the other, and to endeavour to heal it from the bottom by inſerting a ſmall doſſil of lint between the edges of it, to keep it open till it is nearly filled beneath with proper granulations. This is the ſureſt method of obliterating the cavity of the impoſthume; and when any portion of the ſocket is carious, it will more readily exfoliate than it would do were it ſtill covered with the gums.

We have hitherto been ſuppoſing that the abſceſs is ſeated in the gums, or between the gums and the tooth, or perhaps that it ſurrounds the ſocket of the tooth; but it often happens that more deeply ſeated abſceſſes occur, which create not only more immediate pain and diſtreſs, but more ſubſequent riſk: for when the more ſolid parts of the jaw become carious, which they commonly do when the matter of impoſthumes gets into contact with them, the cure not only proves tedious, but marks of a diſagreeable nature are apt to occur from it externally. With a view to prevent theſe diſtreſſing occurrences, we ought not to ſolicit the formation of pus by the uſual method of applying warm poultices outwardly; we ſhould rather, by warm fomentations taken into the mouth, and by the application of any warm ſtimulating ſubſtance, ſuch as a roaſted onion, to that part of the gum which appears to be moſt affected, to endeavour to excite a ſuppuration that may point into the mouth; and as ſoon as there is reaſon to ſuppoſe that matter is formed in the abſceſs, it ought to be opened without waiting for a complete ſeparation.

In the after treatment of the abſceſs, all that we can do is to preſerve a free depending orifice for the diſcharge of any matter that may form, by which any farther miſchief will be prevented, and by which alone we can reaſonably expect a cure; for even where the diſeaſe is connected with a carious ſtate of the jaw, giving a free vent to the matter is perhaps all that art ought in this ſituation to attempt. If the conſtitution is otherwiſe ſound, this, together with the removal of any of the contiguous teeth that are ſpoiled, and of ſuch parts of the jaw as are carious and ſeparate from the reſt, will ultimately effect a cure if this by any means be practicable. But in diſeaſed habits of body, eſpecially in ſcrophulous conſtitutions, affections of this

PLATE LV.

FIG. 1.

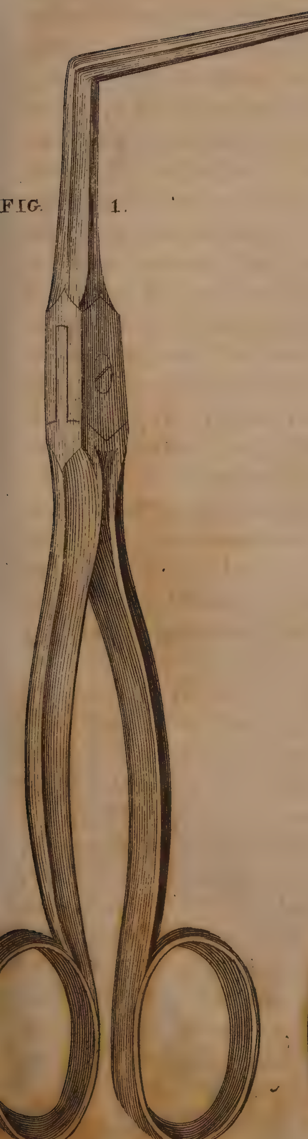
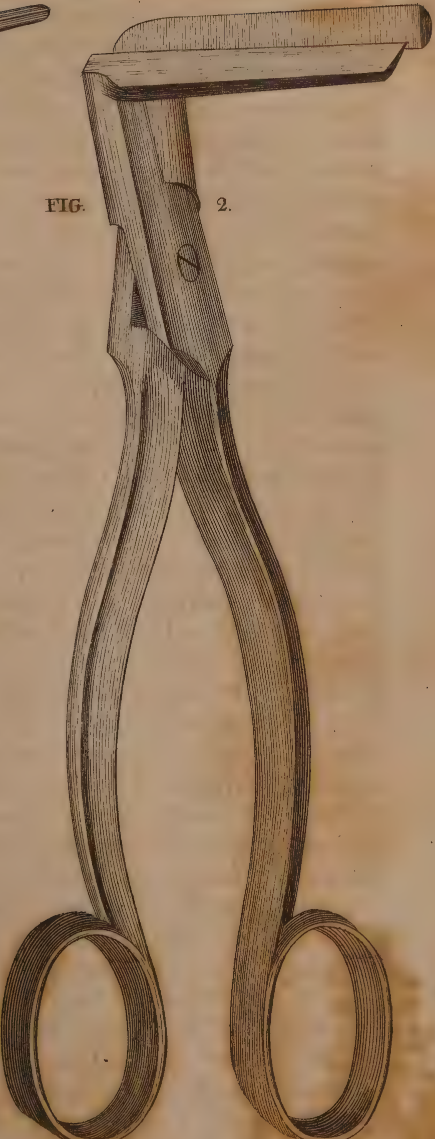


FIG. 2.



this nature are always productive of much diſtreſs, and can ſeldom indeed be healed till the general diſeaſe of the ſyſtem is removed.

SECTION V.

Of Abscesses *in the* Antrum Maxillare.

COLLECTIONS of matter may occur in the antrum maxillare from various cauſes: Whatever tends to induce inflammation on the lining membrane of this cavity may be productive of them. Hence they may be induced by blows and other injuries done to the cheeks. Inflammatory affections of the membrane of the noſe, and even long continued inflammation of the eyes, by ſpreading to the contiguous membrane of the antrum, have often appeared to have ſome effect in producing collections of this kind; and much expoſure to cold has frequently been traced as the cauſe of them. But the moſt frequent origin of this diſeaſe is pain and irritation produced in the jaw by repeated and violent returns of tooth ach.

From this account of the cauſe of the diſorder, the nature of the ſymptoms will be readily underſtood. Indeed, if we make allowance for the nature of the parts in which they occur, they will be found to be nearly ſuch as take place from inflammation and abſceſſes in other parts of the body. At firſt ſome degree of pain is felt over the cheek of the affected ſide, and this frequently continues for a conſiderable time before any external ſwelling is perceived. On a farther continuance of the diſeaſe this pain becomes more ſevere, and in ſome inſtances ſpreads to the neighbouring parts, ſo as to create uneaſineſs in the eye, noſe, and ear; and at laſt an extenſive hard ſwelling appears over the whole cheek, which ſooner or later points at a particular place, moſt frequently in the centre of the cheek, a little above the roots of the poſterior molares.

In ſome inſtances, indeed, the matter burſts out between the roots of theſe teeth and the gums, by which the external tumor upon the cheek is prevented from pointing. This, however, does not commonly happen; and only takes place, I imagine, when the roots of the teeth penetrate the antrum, by paſſing through the plate at the bottom of the ſocket. For the moſt part, too, as ſoon as matter is fully formed in the antrum, we find ſome of it diſcharged by the correſponding noſtril, when the patient lies upon the oppoſite ſide with his head low; and if this occurs frequently, it prevents the external ſwelling for a conſiderable time from pointing at any particular place, and conſequently from burſting, which it always would do if the matter was not evacuated in ſome other manner.

This diſcharge of matter by the duct leading from the antrum to the noſtril does not indeed occur in every inſtance; but as I have met with it in ſeveral caſes, I am not inclined with Mr. Hunter to conſider the obliteration of this duct as a frequent cauſe of theſe collections:* Indeed I doubt if it is ever the cauſe of them. For the moſt part, they may be traced as the conſequence of one or other of the cauſes we have mentioned; particularly of toothach, or of inflammation excited in ſome other manner. It therefore appears probable, when obſtructions are met with in this duct, that they are rather to be conſidered as a conſequence of the diſeaſe: perhaps moſt frequently as the effect of the adheſive ſtage of inflammation, than as the cauſe of the collection.

A diſcharge of matter from one of the noſtrils, when it ſucceeds to pain and inflammation of the cheek, will for the moſt part be found to originate from an abſceſs in the correſponding antrum maxillare; but we ought to remember that matter may be diſcharged from the noſtrils from other cauſes; particularly from an inflamed ſtate of the membrana Schneideriana;

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* See a Practical Treatiſe on the Diſeaſes of the Teeth, &c. by John Hunter, F. R. S. &c. p. 44.

from an ozena; from affections of the frontal ſinuſes; and from abſceſſes in the lachrymal ſac. In forming an opinion, therefore, of ſuch an occurrence, every circumſtance connected with it ſhould be taken into conſideration, otherwiſe much diſappointment and inconvenience may frequently occur by our treating one diſeaſe for another.

In the treatment of abſceſſes of the antrum maxillare, nothing will ever accompliſh a cure but a free diſcharge being given to the matter: Indeed collections of matter in this ſituation ſhould be conſidered in the ſame light with ſimilar affections in whatever part of the body they may occur. Wherever matter is diſcovered, it ought to be diſcharged as quickly as with propriety it can be done: and in no inſtance is it more neceſſary to attend to this than in abſceſſes of the antrum maxillare: for if the matter be not evacuated, it will diſtend and elevate the bones of the cheek, and at laſt will probably render them carious.

With a view to prevent ſuch a diſagreeable occurrence, a perforation ſhould be made into the antrum as ſoon as there is ſufficient evidence, from the nature of the ſymptoms, to conclude that matter is collected in it. It may be perforated in two different parts. In that part of it which projects outwardly over the two great molares; or one of theſe teeth may be taken out, and an opening made into the antrum, by perforating directly upwards in the courſe of one of the fangs. As moſt people wiſh to avoid the pulling of a tooth when it does not appear to be abſolutely neceſſary, the perforation is commonly made in caſes of this kind above the roots of the teeth. This lenity, however, proves often hurtful; for in this manner the perforation muſt be made in the ſide of the antrum, by which a depending opening cannot be given to the matter; nor can this be effectually obtained in any other way but by a perforation made in the manner we have mentioned in the direction of one of the roots of the teeth.

We have already obſerved, that either of the two large molares may be drawn in order to admit of this perforation. When either of them is ſpoiled, the diſeaſed tooth ought to be taken out; for, being carious, there will be ſome reaſon to ſuſpect that it may have ſome ſhare in the formation of the diſeaſe: but when this does not happen, we ſhould remove the ſecond great molaris, or that tooth which lies next to the dens ſapientiæ; for although the tooth immediately anterior to this is ſomewhat more acceſſible, the difference in this reſpect is inconſiderable; and the plate of bone which ſeparates the antrum from the roots of the teeth being thinner in the back part of the jaw than in the anterior part of it, the perforation is accordingly more eaſily made in it.

On removing one of theſe teeth, it ſometimes happens that the matter is immediately diſcharged with freedom from the antrum; owing either to the roots of the teeth having been naturally ſo long as to penetrate this cavity; or, to the matter having corroded the bone which ſeparates them from it. In this caſe, if the opening is ſufficient for evacuating the matter, the operation will thus be completed; but as it is eaſily enlarged, it ought always to be done where there is any cauſe to doubt that the matter will not be diſcharged with freedom. But when no diſcharge of matter occurs on pulling the tooth, an opening muſt be made into the antum in the manner we have already adviſed, by puſhing a ſharp inſtrument into it in the direction of one of the fangs. A common trocar is uſually employed for this, and in general the operation may be well enough done with it; but the curved inſtrument repreſented in Plate L. fig. 2. anſwers better. In making the perforation, the patient ſhould be ſeated on the floor oppoſite to a clear light, and his head ſhould be laid back upon the knee of the operator, who may either be ſtanding or ſitting behind him. The inſtrument ſhould be withdrawn as ſoon as it has entered the antrum, which will be eaſily known by the reſiſtance being removed from the point of it. The matter will now flow out freely; and as ſoon as it is all evacuated, a ſmall wooden plug exactly the ſize of the trocar ſhould be introduced into the opening, with a view to prevent not only the air, but the food during maſtication, from finding acceſs to the antrum; and if the plug be properly fitted to the opening, it will remain ſufficiently firm, while at the ſame time there will be no riſk of its ſlipping in, if it be formed with a knob or head ſomewhat larger than the reſt of it.

This plug ſhould be removed from time to time, perhaps twice or thrice in the courſe of a day; by which all the matter will be quickly evacuated; and no more being allowed to collect, the diſpoſition to form it will in general be ſoon removed, and a cure will thus be obtained. But in ſome inſtances, either from much relaxation of the lining membrane of the antrum, or from ſome other cauſe of a ſimilar nature, the diſcharge of matter does not diminiſh, but continues nearly the ſame both in quantity and conſiſtence long after the operation. In this caſe we may often forward the cure by throwing liquids of a moderate degree of aſtringency from time to time into the antrum. A decoction of bark is commonly employed for this purpoſe: but nothing ſhould be uſed that contains the leaſt particle of ſolid matter, as there is always ſome riſk, when any thing of this kind is injected, of depoſitions being left in the antrum; and in different inſtances I have ſeen miſchief occur from this. I commonly employ a ſolution of alum, brandy properly diluted, or lime water.

When the contiguous bones are all ſound, a due continuation of this practice will at laſt accompliſh a cure; but when any of them are carious, it will be in vain to expect a cure till the diſeaſed portion either exfoliates, or till it diſſolves and comes away in the matter. The introduction of a probe will always render us certain whether any part of the bones in the antrum be carious or not; but we may in general reſt ſatisfied with reſpect to this point, from the ſmell and appearance of the diſcharge. When the bones are carious, the matter is always thin and fetid, and it becomes thicker and leſs offenſive as this affection of the bone diminiſhes.

We have hitherto been ſuppoſing that the antrum is perforated for the purpoſe of diſcharging matter collected in it; but the ſame operation becomes neceſſary for the removal of other cauſes. I once met with an inſtance of a violent blow on the cheek terminating in a collection of blood in this cavity; and worms forming in it can only be removed by this operation. In what manner worms are produced in this ſituation is difficult to determine; but whenever their preſence is indicated by ſevere pains in the region of the antrum, not induced by toothach or any other obvious cauſe, there can be no riſk in making an opening for extracting them; but in this caſe there will be no neceſſity for removing any of the teeth. A perforation made into the antrum, immediately above the roots of the large molares, will anſwer the purpoſe ſufficiently. We ſhould not however reſt ſatisfied merely with extracting ſuch worms as appear at the opening: We ought to inject from time to time ſuch liquids into the antrum as will moſt probably deſtroy any that may remain; particularly oil, a filtrated ſolution of aſafœtida, and perhaps a weak infuſion of tobacco: and the perforation ſhould be kept open for a conſiderable time, to prevent as much as poſſible the riſk of any worms being left.

I have mentioned the only two parts in which I think the antrum can with propriety be opened; namely, in the direction of the roots of the two large molares of the upper jaw; and immediately above the roots of theſe teeth on the outſide of the jaw. I think it right, however, to obſerve, that it has been ſaid, that a perforation may be alſo made into the antrum from the noſtril. There is no doubt of this being practicable;

ble; but we might with perhaps equal propriety ſay, that an opening may be made into it by entering the inſtrument from the roof of the mouth. It is evident, however, that it would not be ſo proper to perforate the antrum in either of theſe parts as in thoſe we have mentioned; and therefore I would not have thought it neceſſary to take notice of them, were it not with a view to give my opinion of this method of making an opening from the noſtril; which being propoſed by very reſpectable authority, I think it right that the younger part of the profeſſion, for whom this is chiefly intended, ſhould know that there is much cauſe to doubt of the propriety of it.*

By purſuing the means we have recommended, almoſt every diſorder ariſing from collections of any kind in the antrum maxillare may be completely carried off: But the antrum is liable to ſwellings of a different kind, of a much more dangerous nature, and which frequently do not terminate but in the death of the patient. They ſeem to originate from an enlargement of the bones of the cheek. No matter is found in the antrum; and therefore no advantage is derived from any perforation that is made into it. I have in different inſtances, indeed, obſerved much miſchief enſue from it: for thoſe who are not much accuſtomed to this branch of practice, are apt to be miſled by the appearance of theſe ſwellings; and, ſuſpecting that they contain matter, they very commonly make perforations into them, which frequently aggravates all the ſymptoms, by occaſioning a more rapid increaſe of the diſeaſe. We ought therefore to be attentive in endeavouring to diſtinguiſh ſwellings of this kind from real collections of matter in the antrum. In abſceſſes of this cavity the cheek ſeldom ſwells to any great extent; and when the diſeaſe has been of long duration, if the matter does not find an opening into the noſtril, or along the roots of the teeth, it commonly points towards the moſt prominent part of the cheek. But when no matter is collected, and when the diſeaſe proceeds from ſome affection of the bones, the ſwelling by degrees arrives at a conſiderable ſize, but it ſpreads equally over the whole cheek, without pointing at any particular part, excepting in the very lateſt ſtages of it, when the ſurrounding ſoft parts becoming affected, ſuppuration ſometimes occurs in them. Till the ſkin becomes inflamed, which never happens except where the diſeaſe has been of long continuance, the ſwelling remains quite colourleſs. But the moſt characteriſtic mark of it is a remarkable degree of elaſticity which it acquires. The bones yield to preſſure; but they inſtantly return to their ſituation on the finger being removed; and if in this ſtate an inciſion be made into them, which I have known done, they are found to be reduced to a ſoft cartilaginous ſtate, and in the advanced ſtages of the diſeaſe to a conſiſtence ſomewhat gelatinous.

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* V. The Natural Hiſtory of the Human Teeth, Part II. page 46, firſt edition, by John Hunter, F. R. S. &c.

This kind of ſwelling is of a nature ſo very obſtinate, that hitherto I have ſcarcely known any advantage reſult from any remedy that has been employed in it. In a few caſes where carious teeth have appeared to have ſome effect in producing it, the removal of them has put a temporary ſtop to the progreſs of the diſeaſe: but even this has never produced any permanent advantage; I mean in the real diſeaſed ſtate of the bones we are now conſidering: for the cheek is, like other parts of the body, liable to ſwellings of a more harmleſs nature, which yield to the remedies commonly employed for them. But in this no benefit occurs either from internal medicines or external applications. Long continued gentle courſes of mercury, along with decoction of mezereon, I have ſometimes thought have proved uſeful; but the good effects reſulting from them have never been of long duration.

PLATE LVI.

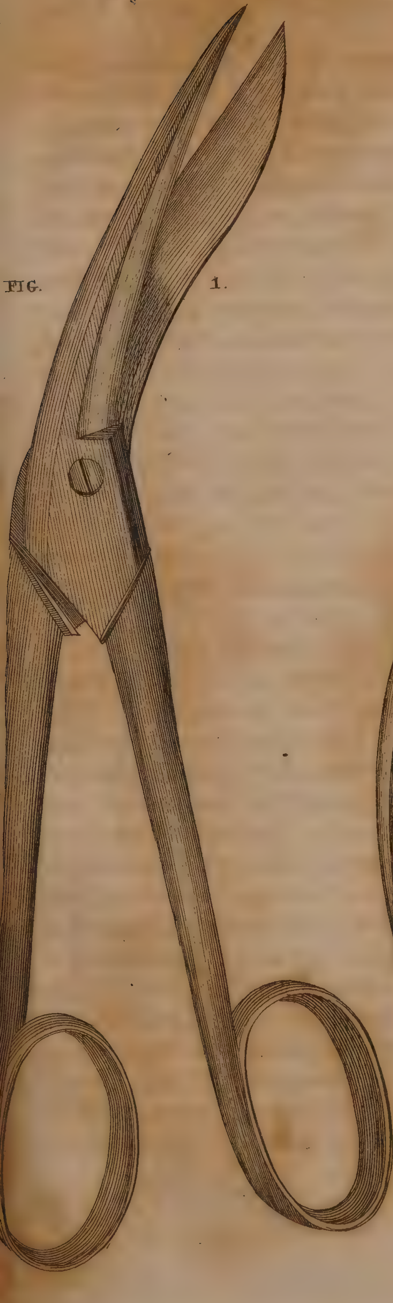


FIG. 1.

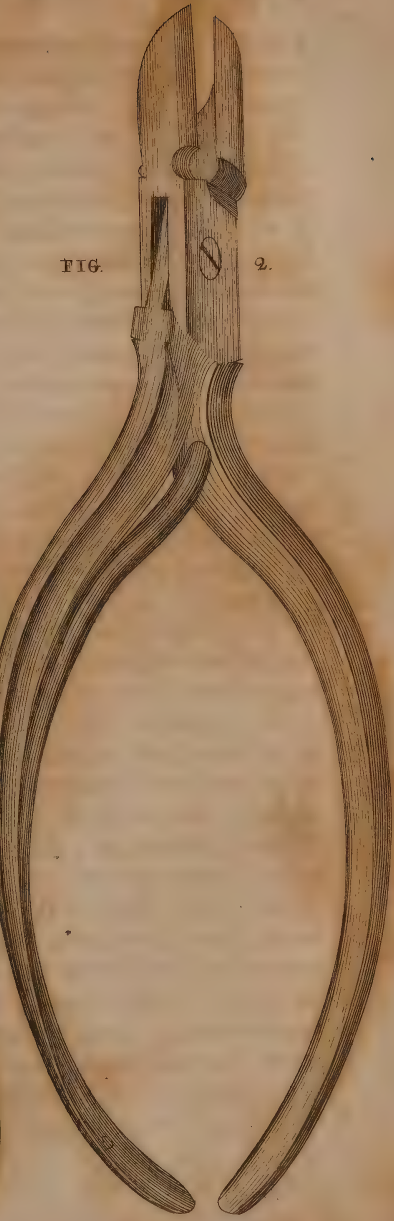


FIG. 2.

SECTION VI.

Of Excreſcences on the Gums.

THE gums are liable to excreſcences of different degrees of firmneſs. They are all of a red colour, nearly the ſame with the gums themſelves; but ſome of them are ſoft and fungous, while others are firm, and even of a hard warty nature. In ſome caſes they are attended with pain, but for the moſt part they create no farther inconvenience than an impediment in ſpeech and maſtication. They are met with in both jaws, but moſt frequently in the under jaw and in the inſide of the teeth. In ſome inſtances they are connected to the gums by a ſmall neck, but in general they adhere firmly through their whole extent.

Excreſcences of this kind frequently originate from carious teeth, and in a few inſtances from a carious ſtate of the alveoli; in which caſe the removal of the ſpoiled teeth, and the ſubſequent exfoliation of the carious part of the jaw, will often accompliſh a cure. Like fungous excreſcences in other parts of the body depending on a carious bone beneath, as ſoon as the deceaſed part of the bone is removed the excreſcence uſually begins to ſhrivel, and at laſt commonly diſappears altogether: but when this does not happen, the tumor ſhould be removed as ſoon as it proves in any degree troubleſome; and this ſhould be the more readily propoſed, as the operation is attended with very little riſk. With thoſe not accuſtomed to this branch of practice, an averſion indeed prevails againſt meddling with tumors of this kind, either from an idea which almoſt univerſally takes place of their being of a cancerous nature, that will probably be rendered worſe by an operation; or from a fear of the hemorrhagy that will ſucceed to the extirpation proving troubleſome. We know from experience, however, that there is in general no cauſe to be afraid of either of theſe circumſtances. I have extirpated ſeveral tumors of this kind; and I never knew an inſtance of a cancer ſucceeding to it, or of any hemorrhagy of much importance.

When the excreſcence is attached to the gums by a narrow neck, it ſhould be removed by paſſing a ligature round it of a ſufficient tightneſs for making it drop off; but when it is connected to the contiguous parts by a broad baſe, we are under the neceſſity of taking it away with the ſcalpel. The actual and potential cautery uſed to be employed for this purpoſe; but as this practice is now laid aſide, and will not readily be revived again, we do not think it neceſſary to deſcribe it.

In proceeding to the extirpation of the tumor, the patient ſhould be firmly ſeated oppoſite to a clear light, and the head ſhould be ſupported by an aſſiſtant ſtanding behind. If he is poſſeſſed of ſufficient reſolution, there will be no need of inſtruments for keeping the mouth open; but where this cannot be with certainty depended on, which is commonly the caſe with children, a ſpeculum oris becomes abſolutely neceſſary. There are various forms of this inſtrument. The one in common uſe is repreſented in Plate LIV. fig. 3; but it occupies too great a ſpace in the mouth to admit of a free application of other inſtruments. To obviate this, I ſome time ago propoſed the one delineated in the ſame plate, fig. 1; and it has by experience been found to anſwer.

A common ſcalpel will for the moſt part anſwer for diſſecting off the tumor; but an operator ought always to be provided with others, particularly with a curved knife, ſuch as is repreſented in Plate XXXVIII. fig. 1. and likewiſe with crooked ſciſſors, ſuch as are delineated in Plate XLIX. fig. 1 and 2; for in ſome inſtances the roots of theſe excreſcences are more eaſily ſeparated with inſtruments of this kind than with thoſe of a ſtraight form. But whatever inſtrument may be employed, much advantage may be derived from elevating the tumor as much as poſſible from the parts beneath with a diſſecting hook; and for this purpoſe a hook ſhould be uſed with two fangs, ſuch as is repreſented in Plate L. fig. 3. which anſwers much better than the ſingle hook in common uſe. In the courſe of the operation, care ſhould be taken to remove the diſeaſed parts entirely, at the ſame time that the inciſion ſhould not be carried ſo deep as to injure the parts beneath, unleſs the tumor be firmly and cloſely attached to them; in which caſe, it may not only be proper to remove a portion of the gums, but even to go to the depth of the ſocket: But as this will be attended with ſome riſk of injuring the contiguous teeth by laying their roots bare, it ought never to be adviſed when with any propriety it can be avoided.

After the operation a moderate degree of hemorrhagy is adviſable, and ought to be encouraged with a view to prevent the ſore from inflaming: But when it proceeds too far, it ſhould be reſtrained, by the patient taking from time to time a mouthful of ſpirit of wine or of tincture of myrrh; or if this does not prove ſufficient, the application of lunar cauſtic will ſeldom or never fail.

The ſituation of the ſore renders the application of dreſſings inadmiſſible: For ſome days, however, after the operation, the mouth ſhould be frequently waſhed with a warm emollient decoction; and afterwards, if a cicatrix ſhould not form ſo readily as might be expected, the cure may be promoted by the application of lime water, Port wine, tincture of roſes, or any other mild aſtringent.

SECTION VII.

Of Loose Teeth.

THE teeth ought naturally to continue firm till they become looſe by the ordinary effects of old age: but they are liable to ſome affections which render them looſe, and which even make them drop out at very early periods of life; and as this is often productive of much diſtreſs and deformity, it becomes frequently an important object with practitioners.

As the teeth may become looſe from various cauſes, all of which require a different method of treatment, we ſhall enumerate the moſt material of them, and at the ſame time ſhall point out thoſe means of cure which ſeem to be beſt adapted for each of them.

The teeth are frequently looſened by external violence: By falls and blows—and often by an improper uſe of inſtruments in pulling the contiguous teeth when carious or otherwiſe diſeaſed.

Teeth looſened in this manner can be made faſt only by being kept for ſome time as firm as poſſible in their ſituation; which may be done by preſſing them as far into the ſocket as they will go, and fixing them with ligatures of Indian weed, cat gut, or waxed ſilk, to the contiguous teeth, and feeding the patient upon ſpoon meat till they become firm.

In young people, when teeth are looſened by external violence, as the ſockets at this age are complete, they readily become firm again when they are kept a due time in their ſituation by ligatures: nay, even when they are forced entirely out of the ſockets, they will ſoon become firm, if they be immediately replaced and retained in their ſituation. I have in ſeveral inſtances put this method of treatment ſucceſsfully in practice, and no harm can reſult from the trial. But in old age, when the teeth become looſe, from whatever cauſe this may happen, the chance of their being again firmly fixed is very ſmall; ſo that in very advanced periods of life the practice ought never perhaps to be attempted.

The teeth ſometimes become looſe from thick layers of tartar forming upon them, and paſſing in between the gums and the roots, and in ſome caſes even between the ſockets and the roots: In this caſe the removal of the cauſe, if it has not ſubſiſted too long, will commonly be attended with a removal of the effect. The tartar ſhould be completely ſcaled off: but it ought to be done as ſoon as poſſible; for the longer the teeth remain looſe, the leſs chance there will be of their ever again becoming firm.

We frequently find the teeth become looſe, from the gums becoming ſoft and ſpongy, and ſeparating not only at their necks, but often a conſiderable way down from the roots. This ſometimes occurs from a long continued courſe of mercury; but it is commonly, although often improperly, attributed to the ſcurvy. It no doubt occurs as a ſymptom in the real ſea ſcurvy: but this is a very uncommon diſeaſe at land; while the other, viz. a ſoft ſpongy ſtate of the gums, is frequently met with.

When, however, it originates from a general ſcorbutic affection of the ſyſtem, nothing but a removal of this will accompliſh a cure; but when it is a local diſorder merely, topical remedies are alone to be depended on. When teeth have remained long looſe, we cannot with any certainty ſay that any means we may employ will render them firm; but the moſt effectual remedy hitherto employed, is, ſcarifying the gums both in the outſide and inſide of the affected teeth. The inciſions ſhould be carried deeply into the ſubſtance of the gums: They ſhould be allowed to diſcharge freely, and ſhould even be repeated from time to time as long as any of the teeth remain looſe. By this means the full ſpongy ſtate of the gums we have deſcribed is often removed, and a diſpoſition produced in them to adhere to the inveſting membrane of the teeth, by which they often become perfectly firm.

With a view to remove this ſpongineſs of the gums, aſtringents are frequently preſcribed; but I never knew any advantage reſult from them: On the contrary, a frequent uſe of them ſeems to do harm, by inducing a diſpoſition in the gums, which deprives them forever of the power of adhering to the parts beneath: at leaſt, I have met with different inſtances where this appeared evidently to be the caſe; in which, by a long continued uſe of remedies of this kind, the gums became ſo hard and firm, that the ſcarifications which were afterwards employed had no effect in fixing them. They ſhould not therefore be uſed till an adheſion is produced between the gums and the teeth, either by means of ſcarifications, or in ſome other manner; and when this is accompliſhed, they may be employed with freedom, and even with advantage. The remedies of this kind that are moſt to be depended on, are, tinctures of Peruvian bark, of oak bark, tincture of myrrh, and a ſtrong ſolution of alum. The mouth ſhould be frequently waſhed with cold water, ſtrongly impregnated with any of theſe, at the ſame time that the patient ſhould be directed not to uſe thoſe teeth that have been looſe till they have for ſome time been perfectly firm.

The teeth are ſometimes looſened by the formation of abſceſſes between their roots and the alveoli; eſpecially when the alveoli, from being thus immerſed in matter, at laſt become carious: But having already treated minutely of this point when ſpeaking of gum boils, in the fourth ſection of this chapter, we muſt now refer to what was then ſaid upon it.

It is ſcarcely neceſſary to mention the looſening of the teeth which occurs in old age: for this takes place from a cauſe for which there is no remedy. Not from the roots of the teeth decaying, or from their being puſhed out of their ſockets; but from a real annihilation of the ſockets; probably in conſequence of the oſſeous matter of which they are compoſed being abſorbed, while nature having now no uſe for teeth, does not continue to ſupply it.

SECTION

PLATE LVII.

FIG. 1.

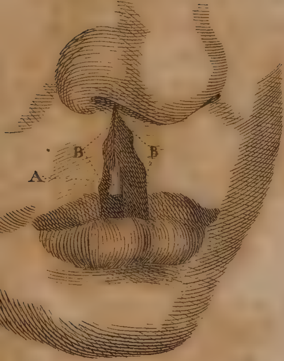


FIG. 2.

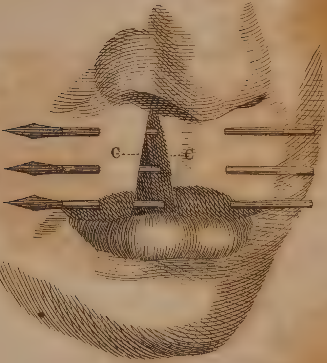


FIG. 3.

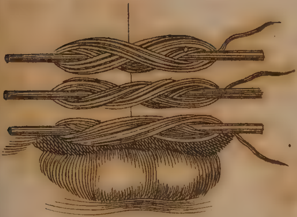


FIG. 4.

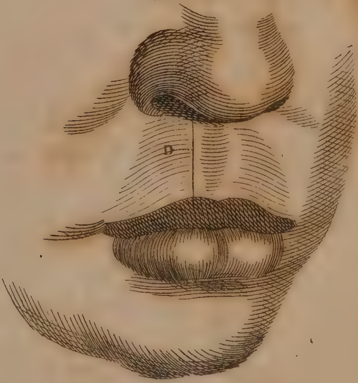


FIG. 5.

FIG. 6.

FIG. 7.

SECTION VIII.

Of CLEANING *the* TEETH.

THE teeth are apt to become foul from different cauſes, and frequently require the aſſiſtance of a dentiſt to render them clean.

1. They ſometimes loſe their natural healthy colour, and acquire a duſky yellow hue: Or they become to a certain degree black, without any adventitious matter being perceptible on any part of them.

2. On other occaſions they become foul, and give a diſagreeable putrid taint to the breath, merely from a too long remora of the natural mucus of the mouth.

3. But the moſt frequent cauſe of foul teeth, is a calcareous matter forming upon them commonly termed the Tartar of the Teeth, which ſeems to be a depoſition from the ſaliva, as calculi in the bladder are from the urine. There are few people entirely exempted from this; but ſome are much more liable to it than others, inſomuch that I have known different inſtances, of the teeth becoming thick incruſtated with it, in the courſe of a few weeks after they have been completely freed from it.

The tartar firſt appears in the fore teeth, and in thoſe parts of them that are leaſt liable to be rubbed upon by the tongue or by the lips. Hence it is firſt perceived on the outſide, in the angles between two of the teeth near to the junction of the gums. The ordinary effects of maſtication prevents it in general from ſpreading towards the points of the teeth: but the diſpoſition to form it is in ſome conſtitutions ſo remarkable, that I have known it proceed from the gums upwards even over the flat ſurfaces of the grinders; and in ſuch inſtances, if it be not removed, it is apt to ſpread over the whole teeth ſo as to give the appearance of a continued incruſtation from one end of the jaw to the other. In ſome caſes again, inſtead of paſſing over the whole, it ſeems to fix more particularly on one or two teeth; and in ſuch inſtances the depoſition of this matter goes on ſo quickly as to give cauſe to ſuſpect that the whole calcareous matter of the mouth is by ſome cauſe or other attracted to this particular point. I have known one or two teeth completely covered with it in the ſpace of a few weeks, while the reſt of the mouth has remained entirely free of it. In ſome caſes theſe partial incruſtations become ſo large as to disfigure the cheek outwardly; and, by thoſe not accuſtomed to this branch of practice, they are ſometimes miſtaken for diſeaſes of a more formidable nature. They have even been treated as exoſtoſes of the jaw bone.

While the tartar conſiſts of a thin ſcale only, and as long as it is confined to the external ſurface of the teeth, and does not prove hurtful to the gums, it ſeldom meets with much attention: but when it forms in any conſiderable quantity, it very commonly hurts the gums by producing ſlight ulcerations upon thoſe parts to which it lies contiguous; or, it inſinuates itſelf between the gums and the alveoli, ſo as to ſeparate them to a conſiderable depth from one another. In either of theſe events, thoſe means ſhould be employed by which we know that it will be moſt effectually removed.

When the teeth have remained long covered with extraneous matter of any kind, if it has acquired any degree of firmneſs, it is ſcarcely poſſible to remove it without the aſſiſtance of inſtruments. Even a ſlight diſcolouring, although it may not be attended with any perceptible covering of an adventitious matter, if it is of long continuance, it can ſeldom be removed in any other manner. But when once the teeth are thoroughly cleaned with ſcaling inſtruments, they may in general be preſerved in this ſtate with a very ordinary degree of attention. Frequent waſhing with cold water; and rubbing them every ſecond or third morning with burnt bread; Peruvian bark; cream of tartar;

tar; chalk; or any other mild application in fine powder, will for the moſt part keep them perfectly clean and white: but this we muſt obſerve is not univerſally the caſe; for the tendency we have mentioned to a foulneſs of the teeth, eſpecially to a depoſition of tartar, is in ſome inſtances ſo great, that the greateſt pains and attention will not prevent the renewal of it. This, however, is not a common occurrence; for we all know, that a due attention to cleanlineſs will very generally prevent every formation of this kind.

We have ſaid, that when once the teeth have become very foul, they cannot be cleaned without the aſſiſtance of inſtruments. This is at leaſt the beſt, as it is the ſafeſt method. It is neceſſary however to obſerve, that the application of acids of a certain ſtrength will in general render the teeth perfectly clean, and even white; for the tartar and other matter that adheres to them being ſoluble in acids, a frequent uſe of them will remove it completely; and we accordingly find, that acids of one kind or other form the baſis of almoſt every waſh that has been advertiſed for the teeth. The public, however, ought to be much on their guard againſt every application of this kind; for the teeth themſelves are very apt to be hurt by acids, inſomuch that it is perhaps impoſſible to employ any remedy of this nature of a ſufficient ſtrength for diſſolving any extraneous matter upon them, that will not at the ſame time prove injurious to the enamel. Every one knows that even the mildeſt vegetable acid will render the teeth rough, or ſet them on edge: We may therefore very readily ſuppoſe, that thoſe of a ſtronger nature, the mineral acids, which are very commonly uſed for this purpoſe, muſt prove much more hurtful; and in fact many have loſt their teeth entirely by the uſe of applications of this kind.

It is indeed ſaid by many, that inſtruments have done much harm, by hurting the enamel of the teeth, at the ſame time that they remove the incruſtation with which they are covered. This I believe has happened in ſome inſtances: but it ought not to be conſidered as the fault of the remedy, but of the manner of applying it. A ſharp inſtrument may no doubt be ſo improperly uſed as to remove the enamel entirely; but this muſt always be the fault of the operator: for every incruſtation to which the teeth are liable may be taken off with ſafety, and without doing any injury whatever to any part of the teeth.

In Plate LVIII. inſtruments of various forms are repreſented for this operation. Figs. 2. 3. and 4. are the beſt, and will anſwer for moſt purpoſes; but the others are ſometimes neceſſary for the removal of ſuch parts of the incruſtation as form between the teeth. They ſhould all be moderately ſharp, otherwiſe the operation will be done with difficulty: but the edge of none of them ought to be fine, otherwiſe it will be apt to turn, and even to break, with the force neceſſary for ſcaling off the tartar.

In performing this operation, the patient ſhould be placed upon a low ſeat, with his face oppoſite to a clear light, and his head ſupported by an aſſiſtant. The ſurgeon himſelf ſhould be ſeated upon a chair ſomewhat higher. It is commonly indeed done while the operator is ſtanding; but we have elſewhere had occaſion to remark, that practitioners ought to ſit at every operation when it can be done with propriety.

The ſurgeon ſhould now wrap the fore finger of his left hand in a wet cloth, with which he is to preſs with ſome firmneſs upon the point of the tooth intended to be firſt cleaned, while the back part of the ſcaling inſtrument will form a point of reſiſtance for the thumb of the ſame hand. In this manner the tooth may be firmly ſupported ſo as to prevent every riſk of its being moved or looſened by the inſtrument. This in every caſe is a neceſſary precaution; but it is particularly ſo when the teeth are in any degree looſe.

The ſharp edge of the inſtrument is now to be inſinuated beneath the under part of the incruſtation, care being at the ſame time taken to avoid the neck of the

PLATE LVIII.

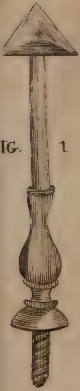
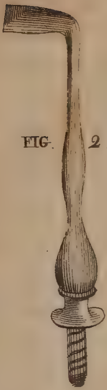


FIG. 1.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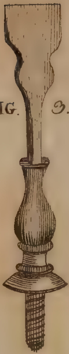
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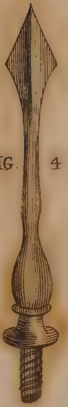


FIG. 4.

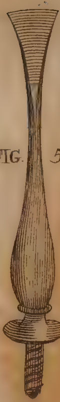


FIG. 5.

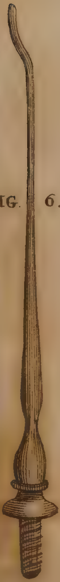
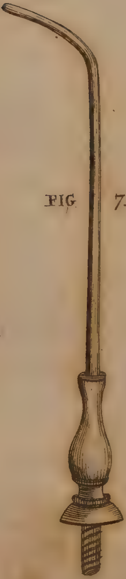


FIG. 6.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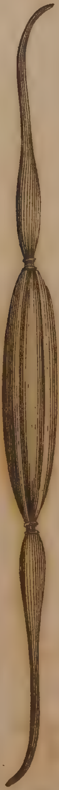
FIG. 8.

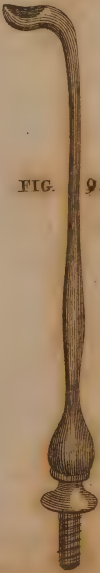
FIG. 9.

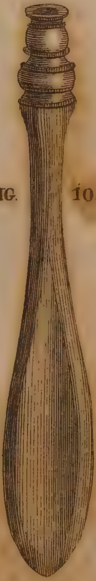
FIG. 10.

the tooth, otherwiſe, if it be puſhed down this length, and if much force be employed, there will be much riſk of looſening, or even of turning out, the tooth entirely. On being certain that the inſtrument is properly placed, it muſt be puſhed with ſome firmneſs from below upwards to the top of the tooth, and muſt be repeatedly applied in the ſame direction as long as any of the incruſtation remains either on the outſide or inſide of the tooth: And one tooth being completely cleaned, all the reſt which require it muſt be treated in the ſame manner. This being done, the teeth ſhould all be well rubbed over with a bit of ſponge in the form of a bruſh, covered with a fine powder prepared of equal parts of cream of tartar and Peruvian bark; and this being continued from time to time, it will ſeldom happen that any farther aſſiſtance will be neceſſary: but if, notwithſtanding of this, the teeth are again obſerved to turn foul, any incruſtation that may form upon them muſt be ſcaled off in the manner we have mentioned.

This is the ſafeſt and moſt effectual method of cleaning the teeth when they become foul from any kind of extraneous matter forming upon them; but they ſometimes looſe their colour, as we have already obſerved, and acquire a kind of foulneſs, when no matter of this kind is perceptible. Even in ſuch caſes, as long as the ſurface of the teeth remains ſmooth and ſound, moderate friction with the edge of a ſcaling inſtrument will frequently prove ſerviceable: and if the operation be done with caution, no riſk whatever will accrue from it. But when the teeth become black from a cauſe of this nature, we ſometimes find the enamel corroded, or perforated as it were with an infinite number of ſmall holes; and this, we muſt obſerve, is the worſt kind of foulneſs to which they are liable: for it is difficult to remove, and when removed, it in general ſoon returns, and ſeldom ſtops till all the teeth which have been attacked with it are deſtroyed.

As this kind of foulneſs cannot be removed with inſtruments, we are under the neceſſity of employing ſome chemical preparation for diſſolving it. All the mineral acids will do this in the moſt effectual manner; but, for the reaſons we have already given, they ought never to be uſed. I have commonly employed ſaponaceous, or even pure alkaline applications; by which the teeth may be often rendered perfectly clean without any injury being done to the enamel. A ſtrong lather of common ſoap will often anſwer; and a ſolution of ſalt of tartar applied over the teeth with a ſmall pencil or bruſh, will on ſome occaſions prove equally ſucceſsful.

When in this manner the foulneſs is removed, frequent waſhing with cold water, and rubbing from time to time with one of the powders above mentioned, are the moſt effectual means for preventing a return of it. I have ſometimes thought too, that repeated applications of tincture of Peruvian bark have proved ſerviceable in preventing it. Indeed, as this variety of the affection ſeems to depend upon ſome cauſe of a putreſcent nature; for it is evidently attended with a caries or mortification of the affected teeth; there is reaſon to ſuppoſe that antiſeptics of every kind may prove uſeful in the treatment of it.

For the purpoſe of applying powders and other applications to the teeth, bruſhes of different forms, and various kinds of roots properly prepared, are daily uſed. Lucerne and alkanet roots dried and beat at one end in the form of a bruſh, are much employed for this purpoſe, and they may be uſed both with ſafety and advantage for cleaning the interſtices between the teeth: but neither theſe nor any kind of bruſh ſhould be employed for rubbing the roots of the teeth and the upper parts of the gum; for as their points paſs in between the gums and the ſockets, they are apt to ſeparate the one from the other, from which much miſchief is apt to enſue. For this reaſon, I always employ a piece of ſponge fixed in a ſmall handle, with which the roots of the teeth may be rubbed with ſafety.

SECTION IX.

Of TOOTH ACH.

TOOTH ach appears to be more unſupportable than any other kind of pain. It renders thoſe who are affected with it very unhappy; and as it is one of the moſt frequent diſeaſes to which the human body is liable, it requires much attention from practitioners. The pain induced by tooth ach, even when it is confined to a ſingle tooth, is often productive of great diſtreſs; but this is trifling when compared with the conſequences which ſometimes enſue from it. Indeed many inſtances have occurred of the ſtrongeſt conſtitutions being ruined by frequent returns of it. Beſides the uſual ſymptoms of pain in one or more of the teeth, and of ſwelling in the contiguous gums; the cheek frequently becomes tumefied; the eye, and even the ear of the affected ſide, are often attacked with pain and inflammation; and to theſe, fever, with all its conſequences, is apt to ſucceed.

Theſe ſymptoms may be induced by different cauſes, and by affections of the teeth ſeemingly of oppoſite natures.

1. They may originate from the nerve and other parts within the cavity of a tooth being denuded, either by external violence, or by the enamel falling off in conſequence of becoming carious or otherwiſe diſeaſed.

2. They may proceed from inflammation, either of the parts within the affected tooth, or of the membrane which ſurrounds the root of it. And,

3. The teeth and contiguous parts of the jaws are often attacked with very violent pain in conſequence of what is uſually termed Sympathy; that is, they often

ten become pained from affections of diſtant parts, very ſevere fits of tooth ach being ſometimes induced by diſeaſes of the eye, of the ear, and of the ſtomach. We ſhall proceed to treat ſeparately of theſe cauſes in the order they are here mentioned.

§ 1. *Of Tooth Ach from the Nerve being laid bare, and of the various Methods of Extracting Teeth.*

In whatever manner the cavity of a tooth be expoſed, we find from daily obſervation, that for the moſt it is productive of much pain; and the reaſon is obvious. Nature, as we have already obſerved, has provided the teeth with nerves, but at the ſame time ſhe has given them a very complete covering of bone; When this protection, therefore, is deſtroyed, either by accident or diſeaſe, it muſt neceſſarily follow, that theſe parts which were not formed for being expoſed, will ſuffer various injuries, not merely from the food and drink finding acceſs to them, but from the external air being at all times freely applied to them.

But it is not the mere expoſure of a nerve, or the violence employed in laying it bare, which produces pain; it is the conſequence of this expoſure, the effects which reſult from it, to which all the diſtreſs which enſues ought to be attributed: Of this every practitioner muſt have met with frequent inſtances. Thus I have often known the cavity of a tooth laid entirely open by a tooth being broke by a fall or a blow, and no inconvenience enſue from it but a temporary pain ſomewhat proportioned to the nature of the accident; and it frequently happens that teeth begin to ſpoil and at laſt moulder away without any pain or uneaſineſs. It is therefore evident, that expoſure of the nerve alone is not to be conſidered as the ultimate cauſe of tooth ach. It is a certain degree of irritability induced by this expoſure which appears to be the cauſe of it; and to this our views ought to be directed in the treatment of it.

This irritable ſtate of the nerve may be induced by various cauſes, and more eſpecially by ſaccharine, acid, and other ſtimulating ſubſtances contained in food, being frequently applied to it;—by a too frequent uſe of tooth picks, which may often be traced as the origin of a fit of the tooth ach;—and by much expoſure to a ſtream of cold air. Expoſure to cold, particularly in a damp ſtate of the air, often terminates in tooth ach by inducing inflammation; but it frequently produces very violent degrees of pain in a tooth already deprived of part of its enamel, when no other ſymptom of inflammation can be diſcovered.

Theſe are the moſt common cauſes of tooth ach when the nerve of a tooth has previouſly been laid bare; and in ſuch circumſtances their mode of operating may be eaſily accounted for; but we cannot ſo eaſily explain or ſuggeſt a reaſon for this ſtate of a tooth being ſuch a frequent occurrence, nor does it appear in what manner it is for the moſt part produced. The enamel is ſometimes broke by falls and blows, and it frequently ſuffers by attempts to break nuts and other hard ſubſtances with the teeth: In ſuch caſes the cauſe is obvious; for we know by daily obſervation, that the oſſeous part of a tooth very ſoon becomes carious and waſtes away on the enamel being deſtroyed. But how do we account for the moſt frequent of all cauſes of tooth ach, the decay or waſting of the enamel by rottenneſs, when no evident external violence has been applied to it? It has been alleged that we may often trace it to a too free uſe of acids, which are generally known to prove hurtful to the enamel; and by ſome it is ſaid that it depends moſt frequently upon a want of cleanlineſs in not waſhing or otherwiſe clearing the mouth of putreſcent particles after meals. Particles of this kind by reſting upon the teeth are ſuppoſed to be capable of communicating ſome degree of their own nature to the enamel; and the affection being once produced in a ſingle point, the contiguous parts will become diſeaſed, we are told, from the ſame cauſe that mortification ſpreads in other parts of the body.

We will readily admit that a frequent application of acids to the teeth, even thoſe of the mildeſt nature, will prove hurtful to the enamel; and therefore they ſhould be avoided; while it is equally clear, that the mouth ſhould be regularly waſhed after meals, not only for preventing that kind of incruſtration upon the teeth which we have already conſidered, but for preſerving a ſweetneſs of breath: It does not however appear probable, that the diſeaſe of which we are now treating, ſpoiled or carious teeth, depends upon either of theſe cauſes. Were it to originate from a too free uſe of acids, it ought to affect all the teeth, or at leaſt a conſiderable part of them, at the ſame time and in an equal degree; whereas it begins almoſt in every inſtance in a very ſmall point or ſpot, which in general extends much more ſlowly than it probably would do if the diſeaſe proceeded from any cauſe of this nature. And again, with reſpect to the effect of any putreſcent particles lodged upon the teeth, we do not think it probable that this diſeaſe can be ever induced by them. A piece of meat remaining in the mouth from one meal to another, may acquire ſome degree of fetor; but it cannot probably in that ſhort period become ſo highly putrid as to deſtroy the living principle in thoſe parts with which it comes into contact. It is a point, however, which may be eaſily determined by experiment; and from the reſult of ſome trials which I made for this purpoſe, there is reaſon to ſuppoſe that the common opinion with reſpect to it is ill founded. A tooth newly pulled was put into the centre of a piece of putrid beef, and after remaining in it for eight days, it was as free from putrefaction as when firſt put into it, neither the enamel nor internal parts of the tooth being in any degree affected; and the experiment being repeated with teeth which had been pulled for a conſiderable time, the reſult was exactly ſimilar. Now, if this happens with teeth entirely dead, even when totally immerſed in highly putrid matter, we may fairly conclude, that a partial application of putreſcent particles to teeth ſtill enjoying life and connected with the reſt of the body, will not probably have much effect: for we know, that in other parts of the body the vital principle has a conſiderable effect in reſiſting putrefaction; and there is no reaſon to doubt of the teeth being endowed with the ſame power of ſelf preſervation. But, beſides this general argument in ſupport of our opinion, we may remark, that if the common idea on this point was well founded, thoſe parts of the teeth ſhould be moſt liable to corruption where particles of food are moſt apt to lodge; while, on the contrary, thoſe parts of them which are not expoſed to this, ſhould ſeldom or never ſuffer. Now every practitioner knows that this is by no means the caſe; for it muſt be acknowledged, that one part of a tooth is juſt as apt to become carious as another. The moſt likely part for food to reſt in is between two teeth; and we allow that the teeth ſometimes ſpoil in theſe parts, but by no means more frequently than in other parts not ſo much expoſed to this inconvenience.

It does not appear, therefore, that the cauſes uſually ſuppoſed to be moſt productive of carious teeth have much effect, nor do we know of any incidental occurrence to which in particular this affection can be attributed: From all the obſervation I have been able to make upon it, I think we ought rather to conſider it as depending for the moſt part upon ſome general conſtitutional cauſe; upon ſome tendency in the ſyſtem to produce a waſting or decay of this particular part. The cauſe of this again I ſhall not pretend to explain; but I think it perhaps equally probable that this rotting of the teeth we are now conſidering, depends upon ſome general affection of the ſyſtem, as that pain in the gout originates from ſome general cauſe. Inſtances no doubt occur, of teeth becoming carious evidently from ſome particular occaſional cauſe, and eſpecially from external violence breaking or cracking the enamel. This, however is not a common occurrence: indeed it is very rarely met with when compared with the frequency of carious teeth; a diſeaſe which in moſt inſtances begins without any evident cauſe, and which in general has ſubſiſted for ſome time before being noticed.

But allowing that the opinion we have offered upon this point were admitted, it may be aſked, To what purpoſe will it tend? Will it ſuggeſt any difference in the treatment of the diſorder? I think it will. As the pain of the tooth ach creates much impatience, and is with difficulty ſubmitted to, if the affected tooth is carious, it is in general not only the deſire of the patient, but the earneſt advice of practitioners, to have it extracted, as being the moſt certain means of obtaining relief. In violent degrees of tooth ach, when the other remedies uſually employed are found to fail, extraction of the diſeaſed tooth ought certainly to be adviſed; and in ſuch circumſtances no perſon can be more clearly of this opinion than I am; but I am equally clear, that, in common practice, this is carried too far, and that many teeth are pulled daily which ought not to be touched. In moſt inſtances, the pain will be removed immediately on the diſeaſed tooth being extracted: but it very commonly happens that relief thus obtained is only temporary, and that the caries ſoon fixes upon ſome other tooth, which in a ſhort time becomes as much diſeaſed as the firſt; and this being likewiſe removed, the diſorder often proceeds from one to another, till ſcarcely any are left. I have met with various inſtances of this, where almoſt the whole teeth have been ſucceſsfully taken out, one becoming carious ſoon after the removal of another. Nor is there even at laſt any advantage gained by the practice; for, after all the teeth are taken out, the pain in many caſes remains equally ſevere in the jaw itſelf.

The frequent occurrence of caſes of this kind tends much to eſtabliſh the opinion of carious teeth being often a conſtitutional diſeaſe; and it likewiſe ſuggeſts the propriety of leſs frequent extraction than what in common practice is found to prevail. As we can never at firſt be certain whether the diſorder depends upon a general cauſe of this nature or not, it is perhaps right in every caſe to extract the firſt, and even the ſecond tooth that becomes affected, as ſoon as the violence of pain renders it neceſſary: but whenever the diſpoſition is ſo ſtrongly fixed in the habit that a third or a fourth are ſoon obſerved to be diſeaſed, the patient ſhould be always adviſed rather to ſubmit to a good deal of diſtreſs than to extract any more: and it often happens, when he has reſolution to ſubmit to one fit of the tooth ach, and to wait till it is completely over, that he never afterwards, in this tooth at leaſt, feels any return of it. Caſes no doubt occur in which this does not ſucceed; but it anſwers often enough to warrant the propriety of giving it a fair trial in perhaps every inſtance: Even where it fails, there is no harm done by the trial; and when it is found to ſucceed, the advantage gained by it is great indeed. For a conſiderable time, I adopted the common practice on this point in its full extent: Every carious tooth attended with pain I adviſed to be pulled; but finding in general that no advantage was derived from it, the reſult being for the moſt part nearly as I have already deſcribed, I was hence induced to attempt a different method; and now, after a patient has had two or three teeth extracted, if the diſeaſe ſtill continues to return, I never adviſe the practice to be puſhed farther, unleſs when the pain is ſo very ſevere as to render it abſolutely neceſſary, which is not however often the caſe. By avoiding expoſure to cold during the fit, and by exhibiting doſes of laudanum proportioned to the degree of pain, the diſtreſs produced by it is at laſt in general removed; and by due attention to cleanlineſs, particularly by frequently waſhing the mouth with cold water, and, when practicable, by ſtuffing the opening in the carious tooth, ſo as to prevent the air from finding acceſs to it, many have been ſaved, not only from the pain and diſtreſs of pulling theſe teeth which became firſt affected, but of loſing others, which in all probability would have become carious if the common practice had been followed of extracting every diſeaſed tooth as ſoon as it becomes in any degree painful.

Having thus endeavoured to ſhow that carious or ſpoiled teeth are moſt frequently produced by ſome general conſtitutional cauſe, we ſhall now proceed to conſider more particularly the means to be employed, not only for preventing, but for removing tooth ach depending upon this cauſe.

In caſes of carious teeth, it has been a prevailing practice to adviſe the black or mortified ſpot to be removed with a file, with a view to prevent the diſeaſe from ſpreading; but, ſo far as my obſervation goes, it ought not to be adopted; for the diſeaſed part of a tooth can never be removed without expoſing thoſe parts which remain to a more free acceſs of air than they were previouſly liable to; and therefore, inſtead of proving uſeful, I have almoſt univerſally ſeen it do harm. In many inſtances, I have known it induce pain where there was none before; and inſtead of preſerving a tooth, it frequently ſeems to have the effect of rendering the remaining ſound parts ſooner carious than they would probably have become if they had not been touched. I am therefore clear, that this practice of filing ſhould be laid altogether aſide; and whoever conſiders the neceſſary effect of it, will probably be of the ſame opinion. It is evident that the part of a tooth already carious cannot be ſenſible of pain. For what purpoſe, therefore, ſhould we remove it? While it remains, it ſerves in ſome degree to cover and protect the ſound parts beneath, while by taking it off they are left perfectly bare, and apt to be hurt by whatever is taken into the mouth.

When, again, as much of the enamel is removed, either by caries or external violence, as to form a hollow of any magnitude, we have it frequently in our power to prevent an acceſſion of tooth ach, by ſtuffing or ſtopping up the opening, ſo as to prevent the air and particles of food from getting acceſs to the nerve. Different ſubſtances are made uſe of for this purpoſe: ſuch as gum lac, maſtich, olibanum, bees wax, and ſealing wax, tin, lead, and gold. When the opening made by the diſeaſe is large, and eſpecially when it is narrow at the bottom, and wider outwardly, maſtich and gum lac, or even a bit of bees wax, will ſometimes anſwer when none of the harder ſubſtances will remain in the cavity: but as they are quickly rubbed down in maſtication, they require to be frequently renewed; ſo that ſome of the metals are preferable when the form of the opening admits of their being employed, which is always the caſe when the tooth is much ſcooped out inwardly, with a ſmall hole leading into it. Gold leaf is ſometimes uſed for this purpoſe; but nothing anſwers ſo well as common tin foil. As much of it ſhould be cut off as it is imagined will be needed; and one end of it being puſhed into the hollow of the tooth with the inſtruments, fig. 6. 7. or 8. Plate LVIII. the reſt of it ſhould be gradually preſſed in till the cavity is completely filled: and this being done, any portion of the tin that may be left ſhould be cut off, when the ſurface of the whole ſhould be made perfectly ſmooth by frequent rubbing with the burniſher, fig. 9. of the ſame plate. But before any attempt is made for ſtopping a tooth, the nerve ſhould be rendered as inſenſible as poſſible; for till this is accompliſhed, the patient will not be able to bear that degree of preſſure which fixing the tin requires. In general the nerve becomes ſufficiently callous for admitting of this, merely by the delay of a few weeks from its being firſt laid bare: but when this does not prove effectual, we may often accompliſh our intention by inſerting daily into the cavity of the tooth a few drops of oil of origanum or of thyme, or any other eſſential oil; by which any ſlight degree of irritability in the nerve may be often removed, ſo as to admit of preſſure being applied to it with freedom.

We have already obſerved, that neither tin, lead, nor any hard ſubſtance, will remain in the hollow of a tooth, unleſs the opening into it be ſomewhat contracted. It has been propoſed, however, when the opening is of a different form, and when the ſtuffing cannot be fixed in any other manner, to do it by drilling a ſmall hole through the ſides of the tooth; ſo that when the lead is preſſed into it, it may be retained by paſſing a peg of ſilver, gold, or any other metal, from one ſide of the tooth to the other. In a few caſes this may ſucceed; but it will not anſwer either where the opening is very wide outwardly, or where the ſides of the tooth are not tolerably firm; for where the external opening is very wide, even a peg paſſed through the centre of the ſtuffing will not keep it ſufficiently firm to prevent ſome parts of the food from finding acceſs beneath it; and, when the remaining part of the tooth is become thin and brittle, it will be apt to break by the means employed for making the hole.

When, however, by any of the means we have mentioned, the hollow of a tooth can be properly ſtopped, it will not only prove the moſt effectual method of preventing frequent returns of tooth ach, but will have ſome influence in preſerving the remaining part of the tooth. I have known various inſtances of this where ſpoiled teeth have been preſerved for a great number of years, without being productive either of pain or any other inconvenience; but this requires the cavity to be very completely ſtopped, ſo as to prevent every poſſibility of acceſs either to food or drink, or even to air.

When a patient with ſpoiled teeth has been liable to frequent fits of tooth ach, beſides ſtuffing them in the manner we have mentioned, he ſhould be as attentive as poſſible to avoid much expoſure to cold: His head ſhould be kept warm by proper coverings through the night; and he ſhould live in a dry ſituation. Indeed, a moiſt atmoſphere proves ſo deſtructive to the teeth, that people who live in wet ſituations find it very difficult to preſerve them; and I have known various inſtances of frequent returns of tooth ach being prevented entirely, by the patient's removing from a damp to a dry ſituation: Nay this will ſometimes ſucceed when every other means have failed.

By due attention to the means we have mentioned, much may be done in preventing people with carious teeth from ſuffering ſo much as they otherwiſe would do: but notwithſtanding all our endeavours, teeth in this ſituation are very apt to become painful, and are often productive of much miſery; ſo that the moſt effectual method of removing it becomes a very important object.

There are ſome varieties of tooth ach which we know from experience may be removed by remedies applied to diſtant parts of the body. Thus when pain occurs in a tooth, as it ſometimes does, from inflammation which firſt began in the ear, it may be more effectually removed by applying a bliſter behind the ear than by any other means: Or when a foulneſs of the ſtomach is the cauſe of it, a vomit will prove the moſt effectual remedy. This we ſhall afterwards conſider in a more particular manner. But when tooth ach proceeds from the nerve of a tooth being laid bare, it will ſeldom happen that any application will prove uſeful that is not made directly to the part itſelf. Bark, electricity, and a variety of noſtrums, are frequently employed; but in this variety of tooth ach, the only remedies I have ever known any advantage derived from, are, anodynes, corroſive applications, and extraction of the tooth.

In ſlight degrees of tooth ach, the pain is ſometimes relieved, or even altogether removed, by applying either opium or laudanum directly to the bare nerve: I have known camphor to prove uſeful, both by itſelf and when conjoined with opium; and it ſometimes anſwers in a liquid form, when diſſolved in ſpirit of wine, when it will not ſucceed in any other way: Ether may likewiſe be mentioned as a remedy which in this kind of tooth ach ſometimes affords relief; but as theſe and other applications of a milder nature do not commonly ſucceed, we are for the moſt part obliged to employ others of a more active kind, with a view to deſtroy the nerve entirely.

A long continued uſe of any of the ſtrong eſſential oils will in ſome caſes, as we have already obſerved, render the nerve callous or ſomewhat inſenſible, but they will never deſtroy it ſo effectually as to prevent the riſk of future returns of tooth ach. This, however, may be done by remedies of a different kind; by the application of ſpirit of vitriol or any other concentrated mineral acid; by inſerting a bit of lunar cauſtic into the cavity of the tooth; or by burning the nerve with the actual cautery. But in uſing either the lunar cauſtic or any of the ſtrong acids, much attention is neceſſary to prevent the contiguous parts from being hurt; for if they be not inſerted with much caution, they are apt to ſpread and to do a great deal of miſchief. The actual cautery may, however, be employed without any riſk of this kind: but in order to derive any real advantage from it, the hot iron muſt be puſhed farther into the hollow of the tooth than patients in general will allow; for if the nerve be not deſtroyed to the very extremity of the root, no advantage will be gained; and this being both tedious and painful, we do not find many that will admit of it; but when a proper application of it is agreed to, we may deſtroy the nerve completely. It may be done with a piece of ſmall wire made ſharp at the point, or the inſtrument repreſented in Plate LVIII. fig. 8. may be employed for it.

It often happens, however, that none of theſe remedies prove effectual, either from patients not ſubmitting to a due application of them, or from practitioners not puſhing them ſo far as they ought to do. In this caſe, when the pain continues violent, we are under the neceſſity of deſtroying the nerve in a different manner, namely, by the extraction of the tooth; and this being done, if the tooth be not much ſpoiled, and if it be not broke in the operation, after the ſocket is properly cleared of blood, it may be replaced in the manner we ſhall afterwards mention when treating of the method of tranſplanting teeth. This will not always ſucceed, eſpecially in the molares; but in the back part of the mouth it is not ſo neceſſary as when the inciſores or canine teeth are taken out, when it will often anſwer: and when a tooth thus replaced becomes firm, it will prove equally uſeful as before; while, from the total deſtruction of the nerve, it will not afterwards be apt to produce pain. We ſhall now proceed to conſider the method of extracting teeth.

As the pulling of teeth is a very frequent operation, much pains has been taken to render it as eaſy as poſſible; and although it is ſtill neceſſarily attended with pain, yet it is now performed both with more eaſe and ſafety than it could poſſibly be in former times, while the inſtruments employed for it were rude and unmanageable.

It is evident that a tooth may be pulled in different directions: It may either be pulled in a perpendicular direction with reſpect to its roots; or it may be made to turn upon its axis by depreſſing the corona or upper part of it, by which the point of the root will be proportionally raiſed; or a ſufficient degree of force may be applied for puſhing it out of the ſocket in a lateral direction.

If theſe methods of operating were all equally practicable, we would not heſitate in determining to which the preference ſhould be given. In raiſing a tooth perpendicularly, it is clear that much leſs violence muſt be done to the contiguous parts than by forcing it out in a lateral direction: for as the roots of the teeth are all firmly fixed in bone, they cannot poſſibly be preſſed out laterally, but with ſuch a force as is ſufficient for breaking or burſting open that part of the alveolar proceſs of the jaw bone with which they are ſurrounded; and as this is in general attended with ſome laceration, and always with much contuſion, of the contiguous ſoft parts, it is neceſſarily productive of a good deal of pain: but as all the ſpace we can obtain, even by the greateſt wideneſs of the mouth, will not admit proper inſtruments for moving the teeth in the back part of the mouth in a perpendicular direction, we are for the moſt part under the neceſſity of uſing ſuch as move them laterally. All the inciſores and canine teeth may indeed be taken out in this manner, and even ſome of the molares, when they are very looſe; but when the molares are firmly fixed, no inſtruments with which we are acquainted will pull them in this direction. Various propoſals have been made for this purpoſe; but although hitherto every attempt of this kind has failed, ſome farther trials may perhaps render our inſtruments ſufficiently perfect for effecting it.

The only inſtruments which practitioners in former times were poſſeſſed of for the extraction of teeth, were different kinds of forceps or tenets, named according to their forms, hawks bills, cranes bills, &c. and different kinds of levers both ſtraight and crooked. Theſe, however, were rudely conſtructed, and it was with much difficulty that teeth firmly fixed were moved by them. In proceſs of time, therefore, various improvements were propoſed on them; but few of theſe being of much importance, we do not think it neceſſary either to deſcribe them, or to give delineations of them; and this eſpecially as they may be ſeen in the works of Garengeot, Scultetus, Hildanus, and other writers of the laſt and preceding centuries. All that we mean to do, is to delineate thoſe inſtruments which are approved of by modern practitioners of reputation; to propoſe ſuch improvements upon theſe as by experience have been found to prove uſeful; and to give a detail of the method of uſing them.

PLATE LIX.

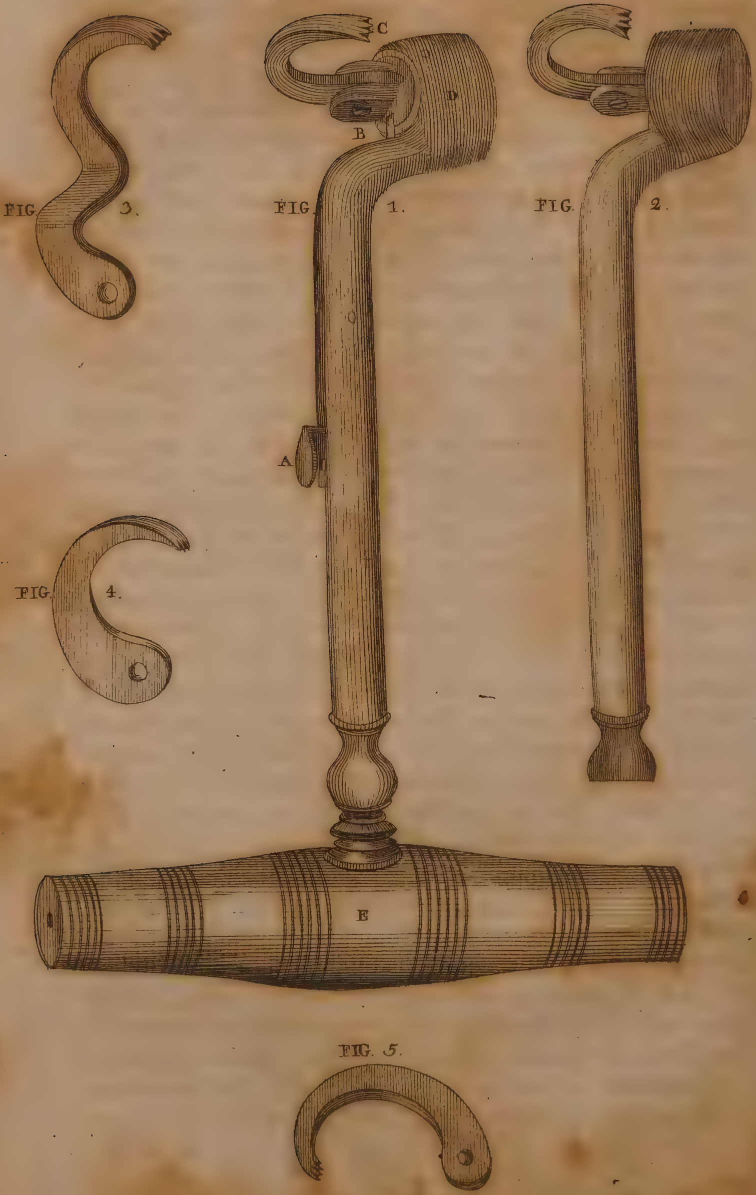
FIG. 3.
C
D
B
FIG. 1.
FIG. 2.
A
FIG. 4.
E
FIG. 5.

For a conſiderable time paſt, an inſtrument, termed a key, has been almoſt the only one employed in Britain for extracting firm teeth, and it is now very generally uſed in different parts of the Continent. It is delineated in Plate LIX fig. 1. and 2.

In operating with this inſtrument, if the tooth to be taken out is in the lower jaw, the patient ſhould be ſeated in a chair, oppoſite to a clear light, while his head ſhould be ſupported by an aſſiſtant ſtanding behind; but if it be in the upper jaw, he ſhould be ſeated upon a pillow, with his head turned back, and ſupported upon the knees of the operator, who in this caſe muſt ſtand behind him, whether the tooth be in the right or left ſide of the jaw: but when a tooth is to be extracted from the lower jaw, if it be on the right ſide, the operator ſhould be placed ſomewhat to the left; and, vice verſa, when the tooth is on the left ſide, the ſurgeon ſhould place himſelf ſomewhat to the oppoſite ſide. With a view to admit of as free an application of the inſtrument as poſſible, as well as to prevent the gums from being lacerated, all the ſoft parts adhering to the teeth ſhould be ſlowly and cautiouſly ſeparated from it by inſinuating between them the point of the ſcarificator, fig. 1. Plate L. and this being done, the operator muſt proceed to the application and uſe of the key. The patient having cleared his mouth of blood, the point of the claw *C*, Plate LIX. fig. 1. muſt be preſſed as far down between the gum and the tooth as poſſible; and in this ſituation it muſt be firmly fixed and retained by the fore finger of the left hand, while the falcrum *D*, being placed as far down as it will go upon the gums on the oppoſite ſide of the tooth, the operator muſt now with his right hand apply ſuch a force as he may find neceſſary for moving it; and by turning the hand ſufficiently round, almoſt any tooth may be taken out at one pull without raiſing the inſtrument: but whenever a tooth is found to be very firmly fixed, and eſpecially if it be one of the large molares, whoſe roots diverge conſiderably, it is better, after it is freely looſened, to remove the inſtrument; and having turned the claw to the oppoſite ſide, to apply it ſo as to turn the tooth to the other ſide of the jaw, by which it will be rendered ſo completely looſe as to be eaſily taken out with the common teeth forceps, Plate LXI. fig. 3.

In uſing the key inſtrument, when the tooth to be taken out is firmly fixed, and eſpecially when there is little or no vacant ſpace between it and the contiguous teeth, ſome attention is neceſſary to prevent theſe from being looſened. When it cannot be prevented in any other manner, the edges of the tooth to be removed ſhould be filed down with a very thin file, which may be done without hurting the neighbouring teeth, by uſing an inſtrument that is quite ſmooth or poliſhed on one ſide.

This I believe to be the beſt method hitherto known of extracting firm teeth from the back part of either of the jaws; and the inciſores and canine teeth may likewiſe be pulled in the ſame manner: but theſe, namely, all the fore teeth, as well as looſe teeth in every part of the jaw, may be pulled in a different manner, which we ſhall afterwards deſcribe.

Although there is ſome difference, as we have already obſerved, between the outer and inner plates of the alveoli of the teeth with reſpect to ſtrength; yet this is ſo inconſiderable, that in pulling a tooth it merits little conſideration. Neither is it a matter of much importance to attend to the direction of the roots in the molares: For although it be alleged by ſome, that theſe teeth may be turned with moſt eaſe towards the inſide of the mouth, from their roots ſpreading in general towards the outſide of the jaw; yet this is by no means the caſe. For the moſt part, the roots of the large molares diverge equally towards both ſides of the jaw; ſo that in this reſpect they may be pulled with the ſame propriety to the one ſide as to the other. But the two laſt molares of the lower jaw afford an exception to this; for they are ſo ſituated, that in every inſtance where the common key is employed, they ſhould be turned inwards. The baſis or origin of the coronoid proceſs forms a ſtrong ſharp ridge on the outſide of the jaw, exactly oppoſite to the roots of theſe teeth; ſo that when they are turned outwards, as the heel of the inſtrument muſt reſt upon this ridge, the gums which cover it are neceſſarily much bruiſed and lacerated. As this is ſeldom attended to, I have ſeen various inſtances of much miſchief being done by it. When a tooth is much ſpoiled on one ſide, it is almoſt the univerſal practice in pulling it, to fix the point of the claw on the ſound ſide; and as this is conſidered as neceſſary, it may be given as a reaſon for our being obliged in ſome inſtances to turn even one of theſe teeth towards the outſide of the jaw. It is not, however, by any means neceſſary that this ſhould be univerſally adopted: for although in general it is ſuppoſed to anſwer beſt to fix the claw of the inſtrument on the ſoundeſt ſide of a tooth, and to turn it to the oppoſite ſide; yet with a very little pains and attention we might, perhaps, in every inſtance follow the very reverſe of this with equal ſucceſs: for with a proper application of the ſcarificator we may almoſt always ſeparate the gums ſo effectually as to be able to preſs the point of the claw far enough down upon the root, ſo as to turn it with eaſe to the oppoſite ſide.

The key inſtrument, however, may be made ſo as to turn even the two fartheſt back molares outward, without doing any injury to the gums lying above the proceſs we have juſt mentioned. A form of it for this purpoſe is delineated in Plate LIX. fig. 3. which I propoſed ſeveral years ago, and which I have often uſed. By the heel of the inſtrument reſting upon the gums beneath the firſt great molares, while the claw is bent in ſuch a manner as to apply to the two poſterior teeth, they may in this manner be turned out with ſafety. The heel ſhould be made long, ſo as to paſs far down upon the gum; otherwiſe, for this particular purpoſe, it will not anſwer ſo well. Indeed the heel of the key inſtrument ſhould be always longer than it is uſually made; for when it is ſhort, it acts with much leſs power, and is more apt to break the tooth, than when it is made of a greater length. The contrary of this I know has been much inculcated; but after having given a fair trial to both methods, I am now convinced that the key with a long heel is much preferable to the other. The principal objection that has been raiſed to the uſe of a long heel is, that it muſt bruiſe the gum more than when a ſhort one is uſed. This, however, is not the caſe, as will be readily allowed by any who attentively conſiders the ſubject; For even the ſhorteſt heel muſt preſs upon ſome part of the gum; otherwiſe, if it be applied upon the tooth itſelf directly oppoſite to the point of the claw, as ſome have adviſed, it will act in nearly the ſame manner, and with no farther power than the common forceps: While again, a long heel does not, as is commonly imagined, injure the gums in proportion to the length of it: for although the flat ſide of it be applied to the gum at firſt, as ſoon as it begins to act the fartheſt extremity of it only will be found to touch them; and accordingly this part of the heel, as well as all the reſt of it, ſhould be made as ſmooth as poſſible; ſo that in turning upon the gum, it will do leſs miſchief than when it is made rough according to the uſual form.

We have already obſerved, that in the pulling of teeth there is no cauſe for being attentive to which ſide they are turned, from any difference of ſtrength between the outer and inner plates of the alveoli or ſockets; for in this reſpect they are nearly ſimilar. But even although the difference was greater than we find it to be, it ſhould not be regarded: for in pulling a tooth in the manner we have deſcribed, namely, in an oblique or lateral direction, it is evident that the ſocket muſt be broke on both ſides of it; at leaſt this muſt be always the caſe where the roots of the tooth are of the uſual length, and not ſhortened, as they ſometimes are, by diſeaſe; for while the corona of the tooth is

PLATE LX.

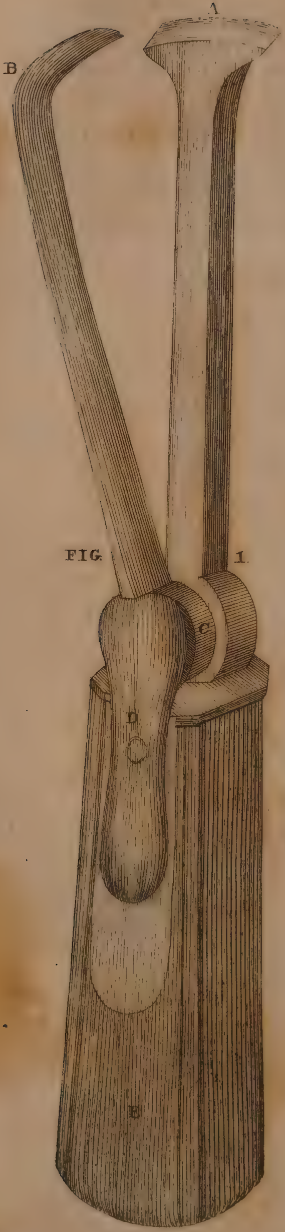

FIG. 1.

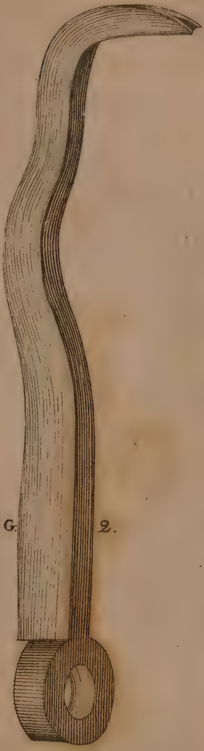

FIG. 2.

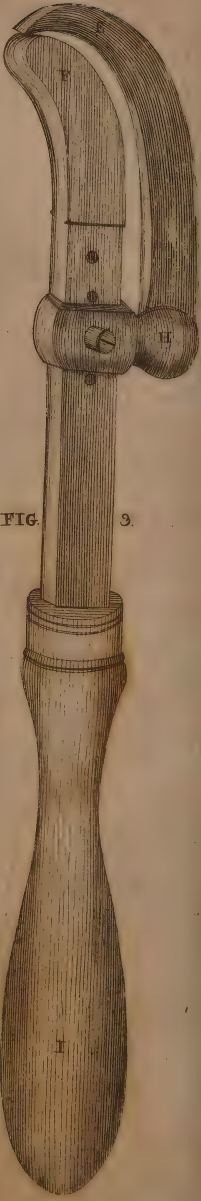

FIG. 3.

forced down upon one ſide of the ſocket, the point of the root muſt neceſſarily be turned in nearly the ſame proportion upon the other. The ſofter parts will not indeed ſuffer ſo much, as they will not be bruiſed by the heel of the inſtrument; but it is clear that the ſocket muſt be always much hurt by it; ſo that in every point of view, little or no conſideration is due in this operation to any difference that is ſuppoſed to take place in the ſtrength of the two plates of which the ſockets of the teeth are formed.

But as it is of much importance to ſave both ſides of the alveoli as far as is poſſible, nothing ſhould be omitted that can with any propriety be done to protect them. For this purpoſe a form of the key inſtrument has been propoſed, by which it is intended to ſupport the gums and alveoli: while at the ſame time the tooth is raiſed and ſeparated from them, by turning the inſtrument in the uſual manner. But if the ſocket be ſo effectually ſupported as to prevent it from yielding on the tooth being preſſed towards it, there is much reaſon to fear that the tooth itſelf will break; and if the inſtrument be not applied in ſuch a manner as to have this effect, it will anſwer no other purpoſe than the key in common uſe; while being more complex, it is managed with more difficulty. The propoſal, however, is ingenious, and may lead to improvement in the operation of tooth-drawing.*

In pulling a tooth with the key inſtrument it is the common practice to force it out at once. But although this may often ſucceed, it is by no means adviſable: for when the roots diverge much, or when any portion of the fang is enlarged, as is ſometimes the caſe, we run a great riſk, by this method, of breaking them, at the ſame time that the ſocket muſt be much more broke than when the tooth is looſened in the manner we have directed, by turning it firſt to one ſide and then to the other with the key inſtrument, ſo as to be able

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* This inſtrument is the invention of Dr. John Aitkin. For a more particular account of it, ſee Eſſays on ſeveral important ſubjects in Surgery.

afterwards to take it out with the common forceps. And if this be done ſlowly, with a gradual equal preſſure, and if the heel of the key has been properly covered with ſeveral plies of ſoft old linen, ſcarcely any miſchief of importance can be done by it: But inſtead of this, when the hard inſtrument is applied directly to the gum, without the intervention of any ſoft ſubſtance, and when the tooth is turned out, as is frequently done, by a ſudden jerk, the gums will not only be greatly bruiſed and lacerated, but the ſocket will be much more broke, at the ſame time that the tooth itſelf will run a much greater riſk of being broke than when pulled in a more gradual manner. It is natural for patients who are ignorant of the riſk attending it, to wiſh for the operation to be quickly done; but it is unpardonable in practitioners to indulge them in this, when a moment's reflection muſt convince them, that it can ſeldom be done but with much riſk of breaking either the jaw or the tooth.

Even when the operation is done in the moſt cautious manner, troubleſome accidents will ſometimes occur from it: And theſe particularly are, bruiſing of the gum; ſplinters of bone being ſeparated from the jaw; and alarming hemorrhagies.

Laceration or even bruiſing of the gum being a very painful part of the operation, it ſhould be prevented as far as poſſible, not merely by covering the heel of the inſtrument in the manner we have adviſed, but by avoiding the application of it altogether, when it can poſſibly be done, while the gums are much inflamed: for while the inflammation continues, the operation proves neceſſarily much more hurtful than it otherwiſe would do. For obviating the effects of laceration, when any ſmall portion of gum is much ſeparated from the reſt, it ſhould be cut off with a pair of ſciſſors; the mouth ſhould be fomented from time to time with warm milk or any emollient decoction; and when there is reaſon to imagine that ſuppuration will take place, it ſhould be encouraged by the application of roaſted figs by way of cataplaſm. In this manner, if an abſceſs occurs, it will be ſoon brought to maturation; when, if it does not ſoon burſt, it ſhould be opened: And again, in caſes of ſlighter contuſions, nothing alleviates the pain induced by them ſo effectually as the applications we have mentioned.

When the bone happens to be ſplintered, if it is the ſocket merely that has ſuffered, very little uneaſineſs will probably enſue from it; and therefore it is ſcarcely neceſſary to mention it even to the patient. But when the ſplinter extends to the more ſolid part of the jaw, which in children eſpecially is apt to happen, if the operation be not done with the utmoſt attention, as the ſore which enſues proves commonly tedious, and as it will not readily heal as long as any looſe pieces of bone remain in it, any of theſe that are perfectly detached ſhould be taken away immediately; but as they are ſeldom ſo completely ſeparated as to come away eaſily at firſt, no force ſhould be uſed in it, as they will afterwards either fall out of themſelves or will be taken away without any difficulty, on a free formation of matter taking place. After this, if the matter be prevented from lodging, and if the conſtitution be in other reſpects ſound, the ſore will probably heal with eaſe.

Hemorrhagies of importance do not frequently occur from tooth drawing; for the blood veſſels which ſupply the teeth being ſmall, it is ſcarcely poſſible that much blood can be diſcharged by them. But when the roots of teeth are deeply fixed in the jaw, and when much force has been uſed in the operation, we can eaſily ſuppoſe that in this manner ſome of the larger arteries of the contiguous parts may be divided; and it is thus I imagine that any troubleſome hemorrhagy which occurs here is ever produced. At firſt we adviſe the patient to take frequent mouthfuls of cold water, red wine, brandy, vinegar, or even alcohol; and for the moſt part one or other of theſe will prove ſucceſsful; but when they happen to fail, other means muſt be employed, and the eaſieſt of theſe is compreſſion. A doſſil of ſoft lint being fitted to the opening, muſt be puſhed into it; and the patient being deſired to make a conſtant preſſure upon it, by keeping the mouth ſhut, if this be perſiſted in for a ſufficient length of time, it will very rarely fail. I have met with inſtances, however, even of every trial of this kind proving unſucceſsful, and of fainting and other diſagreeable ſymptoms occurring from the violence of the hemorrhagy. In ſuch a ſituation the actual cautery is alone to be depended on; and it muſt be applied with freedom, otherwiſe no advantage will be derived from it. A ſmall bit of lunar cauſtic inſerted into the opening might in ſome caſes anſwer the ſame purpoſe; but it does not act with ſuch certainty as the other, while at the ſame time there is a greater riſk of miſchief being produced by it, from its being apt to ſpread ſo as to injure the contiguous ſound parts.

The key inſtrument which we have recommended, is perhaps the beſt hitherto invented for the pulling of teeth in an obliqne or lateral direction; but there are ſeveral others which are uſed in different parts of Europe that act nearly on the ſame principles: Theſe, however, being leſs perfect, will not all be delineated here; but with a view to convey ſome idea of them to ſuch as may not have an opportunity of ſeeing them, I have given a repreſentation of two of them in Plate LX. figs. 1. and 2. But even theſe, although they are the beſt I have met with, are very inferior to the key: for they act with much leſs power; and they have this great defect, that they can never be employed for pulling teeth towards the inſide of the mouth.

We have thus deſcribed the method of extracting firm teeth from the back part of the mouth. Any of the fore teeth may likewiſe be pulled, as we have already obſerved, with the ſame inſtruments; for they may be turned either inwards or outwards by a proper application of the key: but they may alſo be pulled in a different manner; and as this may be done

PLATE LXI.

FIG. 1.

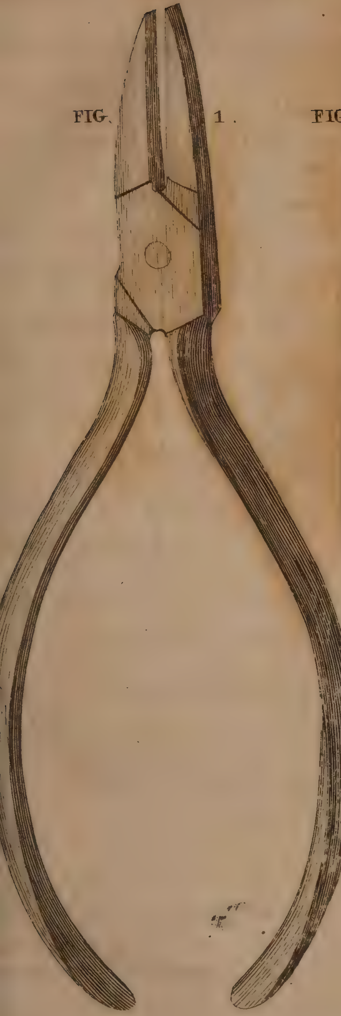


FIG. 2.

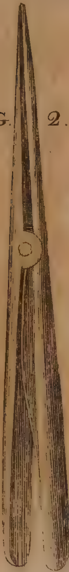


FIG. 3.

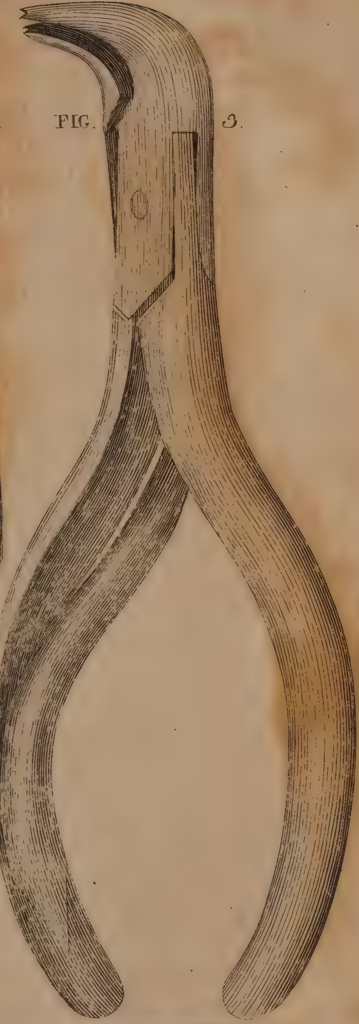


FIG. 4.

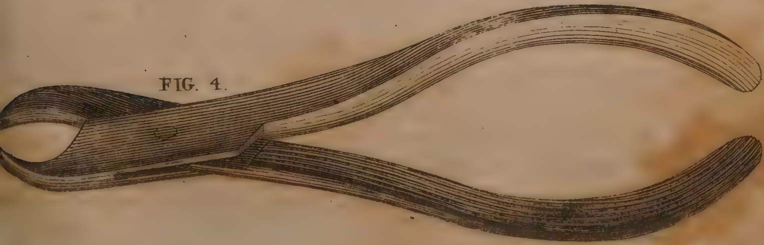


PLATE LXII.

FIG. 1.

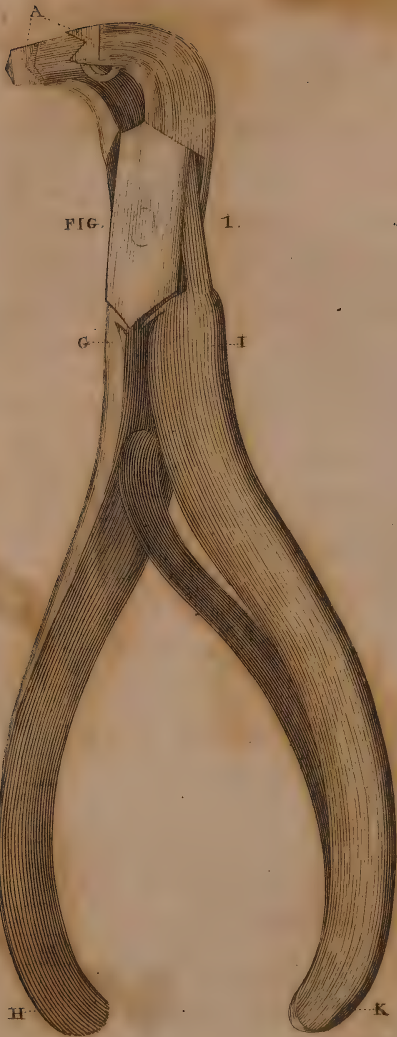


FIG. 2.

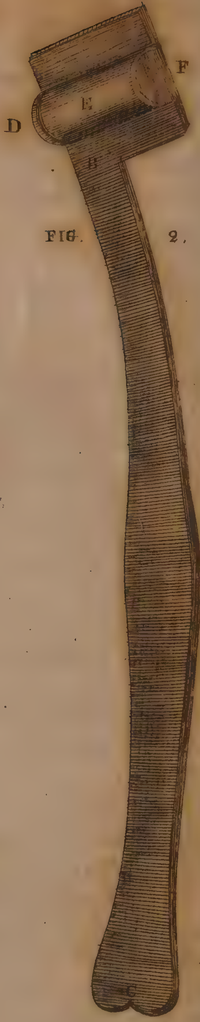
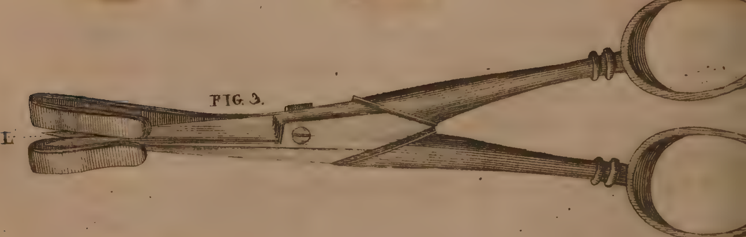


FIG. 3.



with inſtruments which do not bruiſe the gums, it ſhould perhaps in every inſtance be preferred.

The inciſores and canine teeth, and even the two ſmall molares, have only one root; ſo that they are never ſo firmly fixed in the jaw as the large grinders; and therefore they may be extracted with more eaſe. For the moſt part this may be done with the common teeth forceps repreſented in Plate LXI. figs. 1. 3. or 4. In uſing this inſtrument, it ſhould be preſſed as far down upon the tooth as poſſible, otherwiſe it is apt to break off the corona or upper part of it, and to leave the root; and the tooth ſhould not be pulled directly upwards, but ſhould be twiſted alternately from one ſide to the other till it becomes looſe, when it may be taken out without further trouble.

In ſome caſes, however, even theſe teeth are too firmly fixed to admit of their being pulled with this inſtrument: we have therefore given a repreſentation of forceps that act with more power; a very ingenious invention firſt made public in the Britiſh Magazine in the year 1762. It is delineated in Plate LXII. figs. 1. and 2. Fig. 1. repreſents a common ſtrong forceps with moveable claws. The axis of the claws is ſhown at *A*. Fig. 2. is a fulcrum. *B*, *C*, is the handle going off obliquely from *B*, by which it is more eaſily applied. *B*, *F*, *D*, is a plate of iron covered underneath with a piece of ſoft buff; and *E* is the other ſide of the ſame plate made round, ſmooth, and uncovered. The tooth intended to be pulled is laid faſt hold of with the forceps, fig. 1. then the fulcrum, *B*, *F*, *D*, is placed upon the neighbouring teeth, when the forceps being placed upon the round part of the plate *E*, by a proper motion of the lever *G*, *H*, *I*, *K*, the tooth is in this manner to be extracted. In the pulling of looſe teeth, this inſtrument may be uſed ſo as to draw them nearly ſtraight up; and this we are told may be even done where the teeth are quite firm, provided their roots do not diverge much, and that there be no oſſeous adheſions between them and the ſockets:

but with a view to prevent any bad conſequences that might occur from the application of much force, we are deſired by the anonymous author of the inſtrument, inſtead of attempting to pull firm teeth directly upwards, to twiſt them a little outwards, which looſens them ſo much, that they may then be pulled almoſt in a perpendicular direction with much eaſe.

The advantages ſuppoſed to be derived from forceps with moveable claws is this: When the common forceps is uſed with immoveable claws, if the tooth be firm, it muſt either be forced out obliquely, or the firſt hold muſt be loſt, and the inſtrument fixed again: but when the claws are moveable, it will always retain its hold, and the tooth will be pulled nearly in a perpendicular direction; for the claws, by turning upon centres, will always fall into the way of the tooth; and will therefore raiſe it very nearly in a ſtraight line.

We have taken different opportunities of obſerving, that the moſt painful part of tooth drawing ariſes from the bruiſing and laceration of the gums and ſockets; a circumſtance which cannot be altogether avoided when the key inſtrument is employed. The great object of the forceps we have juſt been deſcribing being to pull in a ſtraight direction, by which the gums and ſockets are almoſt entirely ſaved, would render it the moſt complete inſtrument that has hitherto appeared, were it not liable to ſome very material objections. The ingenious author of this forceps thinks it may be employed for the extraction of any teeth; even of the large molares: but, as the mouth cannot be ſo widely opened as to admit of the proper application of it, this ſhould never be attempted. It muſt therefore be confined, as we have already obſerved, to the pulling of teeth in the fore part of the mouth. But beſides this, as the fulcrum is placed upon the contiguous teeth, when the tooth to be pulled is firmly fixed, it is ſcarcely poſſible to prevent thoſe from being hurt: for they will be very apt to ſuffer even when the preſſure is made as nearly as it can be done in the direction of their roots; and when this is not attended to with much exactneſs, they are apt to be broke, or even to be forced entirely from their ſockets. In the pulling of all looſe teeth, however, and whenever it is found that the fore teeth are not ſo firmly fixed as to require much force to move them, this inſtrument may be employed with much advantage. When again, it is diſcovered upon trial, that an unuſual degree of force is neceſſary, a prudent practitioner will rather lay the forceps aſide, and finiſh the operation with ſome other inſtrument. The common key, as we have already obſerved, may be uſed; or either of the inſtruments, fig. 1. and 2. Plate LX. may be employed for looſening the tooth; after which it may be taken out either with theſe or with the common forceps.

We have hitherto been ſuppoſing that the tooth to be pulled is only carious in a particular part, and that a conſiderable part of the corona is ſtill remaining. When a tooth becomes ſo much diſeaſed that the upper part of it falls entirely off, ſo as to leave little, or perhaps nothing, above the gums, the remaining part of it is thus reduced to what is commonly termed a ſtump.

In this ſtage of the diſeaſe, the connection between the remaining roots and the ſockets undergoes a very important alteration. By the corona being removed, the roots, whatever number there may be, are all ſeparated from each other; for as they are united ſolely through the intervention of the corona, it is evident that their connection muſt be deſtroyed on this being taken away. In this manner their connection with the ſockets is rendered not ſo firm as when diverging roots, tied together above, tend all to ſupport each other; but they become ſtill more looſe by a diſſolving or waſting proceſs, to which teeth in this ſituation are particularly liable. A conſiderable part of the corona of a tooth may become carious, and fall away, without any effect being produced upon the roots; but I have ſcarcely known an inſtance of the corona being completely removed for any length of time, where the roots did not ſuffer a remarkable diminution. Nay, in ſome caſes, the roots, even of the largeſt molares, have been almoſt completely annihilated; and inſtead of the long fangs with which theſe teeth are furniſhed, only a ſmall point or two of ſpoiled bone has been met with. In conſequence of this they become looſe; and their connection with the jaw being now very ſuperficial, they may be forced out much more eaſily than it is poſſible to extract a large tooth. I know that practitioners in general are of a different opinion, the pulling of a ſtump being for the moſt part conſidered as a more difficult as well as a more painful operation than the extracting of a large tooth. This, however, can proceed only from want of experience in this branch of practice; for thoſe who are more verſant in it know well, that there is much more pain, hazard and difficulty, in the pulling of a complete tooth when firmly fixed, than in the taking out of ſeveral ſtumps.

When the point of the claw can be forced ſo far down upon a ſtump as to get a firm hold, it may be pulled with the key inſtrument in the manner we have adviſed for the extraction of large teeth; but this ſhould not in general be adviſed, as we may commonly employ a ſufficient force with inſtruments which do no injury to the gums, and by which a very painful part of the operation may be avoided. When the ſtump can be laid hold of either with the common forceps or with thoſe with moveable points, this will be the eaſieſt method of pulling it: but when it is ſo much ſpoiled as to be nearly, or perhaps entirely, covered with the gums, the points of the forceps cannot be preſſed ſufficiently down upon it; in which caſe, we are under the neceſſity of forcing it out with a ſimple lever. This inſtrument is commonly termed a Punch: different forms of it are repreſented in Plate LXIII. figs. 1. 2. and 3. In uſing it, the gums muſt be freely ſeparated from the ſtump with a ſcarificator; and the point of it being preſſed down upon the root, a de-

PLATE LXIII.

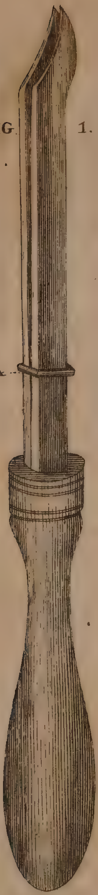


FIG. 1.

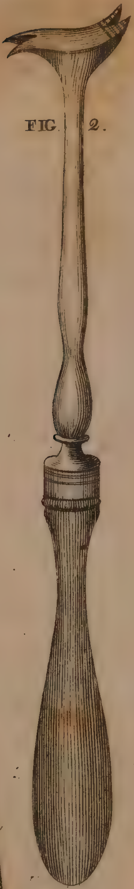


FIG. 2.

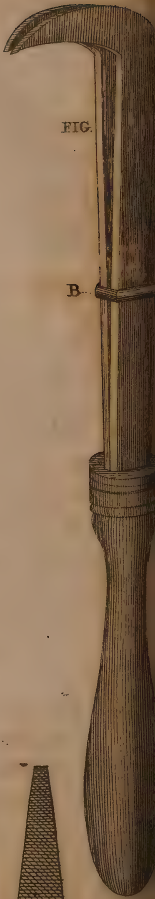


FIG.

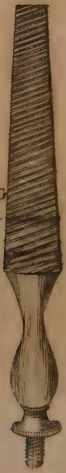


FIG. 4.

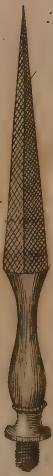


FIG. 5.

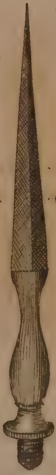


FIG. 6.

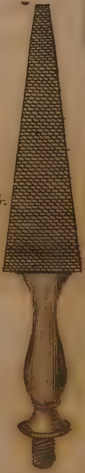


FIG. 7.

gree of force muſt be applied ſufficient for raiſing it completely out of the ſocket; and this being done with one of the fangs, the inſtrument muſt be applied in a ſimilar manner to the reſt of them.

With thoſe accuſtomed to the uſe of the punch, this operation is ſimple and eaſy, while with others it is often both difficult and tedious. In order to be able to apply as much force as poſſible, the point of the inſtrument is commonly puſhed as far as it will go towards the root of the fang: But by this means much of the force that is employed is loſt againſt the alveoli of the oppoſite ſide; which being firmer and ſtronger towards the baſe of the jaw, they do not ſo readily yield at this part as where they are thinner and not ſo firmly ſupported. In general, it will be found to anſwer better to puſh the inſtrument no farther down upon the fang than is merely neceſſary for procuring a ſufficient reſt for the point of it; for I know from experience, that a ſtump may be forced out in this way with much more eaſe than in any other manner. When it does not come out at once with the punch, but is merely looſened by it, it may in this ſtate be laid hold of with the forceps, and removed in the manner we have already pointed out.

For the moſt part, a punch of ſuch a form as is repreſented in Plate LXIII. fig. 1. anſwers beſt. With this the force is applied ſo as to puſh the fang towards the oppoſite ſide of the jaw; but it ſometimes happens that the upper point of the root is of ſuch a form as does not ſo readily admit of force being applied to it in this direction: in this caſe we employ a kind of hook or crooked lever, ſuch as is repreſented in fig. 3. by which the ſtump is drawn or raiſed in a contrary direction.

I have thus deſcribed what by experience I have found to be the ſureſt and eaſieſt method of extracting teeth. A variety of inſtruments may indeed be met with in other authors, which I have not mentioned, and by which it is ſaid, by the inventors of them, that the operation may be done with more eaſe. But this not being ſupported by the reſult of practice and obſervation, it will not be expected that I ſhould give any account of them.

§ 2. *Of Tooth Ach from Inflammation.*

The ordinary ſymptoms of tooth ach ariſe, for the moſt part, as we have already remarked, from the nerve being laid bare, either from a tooth becoming carious, or from the enamel being broke by external violence. It ſometimes happens, however, in a very violent manner, merely from an inflamed ſtate of the membrane ſurrounding the root of a tooth, or from the parts within the body of the tooth becoming inflamed. We judge of this being the cauſe of toothach, when a ſevere permanent pain attacks a tooth which outwardly appears to be ſound: and this eſpecially when it has been evidently induced by much expoſure to cold; or when it is connected with other ſymptoms of inflammation, ſuch as an inflamed ſtate of the contiguous cheek, ſwelling and ſuppuration in the adjoining gums, &c.

In moſt inſtances, we may be able to trace this variety of toothach to the cauſe we have mentioned, namely, expoſure to cold; in ſome caſes, however, it proceeds from cauſes of a different nature. Whatever will produce inflammation in other parts of the body, will be attended with the ſame effect when applied to the membrane ſurrounding the root of a tooth: and we know from experience, that inflammation of this membrane is ſometimes induced by a diſeaſe to which the roots of the teeth are liable; what is termed the Swelling of the Fang, a hard knot or exoſtoſis which now and then forms at the point of the root. At firſt, the pain induced by this may be ſuppoſed to originate from diſtenſion alone; but ultimately it commonly terminates in a very ſevere degree of inflammation. And inflammation of theſe parts, by whatever cauſe it may be induced, is always attended with a more violent pain than what commonly takes place from ſimilar affections in other parts, owing to their being here ſurrounded with bone, which prevents them from yielding ſo readily to that diſtenſion of the veſſels with which inflammation is always accompanied.

In the treatment of this variety of the diſeaſe, we will find in general, that thoſe remedies prove moſt ſucceſsful which anſwer beſt in inflammatory affections of other parts. Local blood letting, either by ſcarifying the contiguous gums with a lancet, or by the application of leeches, often gives relief. I have known the pain removed entirely by the application of a bliſter directly oppoſite to the part affected: and much advantage is often derived from a large doſe of laudanum; for, by procuring a temporary diminution of pain, it thus leſſens irritation, and hence an abatement of the inflammation itſelf. The head ſhould be kept warm by covering it completely with flannel; a practice which ſhould be inculcated with all who are liable to toochach, from whatever cauſe it may proceed, but particularly when it originates from inflammation; and in this caſe fomenting the head with the ſteams of emollient herbs, or even of warm water alone, will often procure relief when every other remedy has failed. In ſome caſes indeed, cold water, vinegar, or ardent ſpirits taken into the mouth, prove ſerviceable; but for the moſt part warm applications prove more uſeful in this variety of toothach.

By a due perſeverance in the uſe of one or other of theſe remedies, the pain will commonly be at laſt removed; and in toothach ariſing from inflammation, we are particularly induced to perſevere in applications of this kind, from our knowing that the diſeaſe is not apt to return after it is once removed. But when they do not prove ſucceſsful, we are under the neceſſity of adviſing the extraction of the tooth, which is often the only remedy to be depended on. In extracting a firm tooth, we have already adviſed it to be done in a ſlow gradual manner in every caſe, with a view to prevent the tooth from breaking, and the jaw from ſuffering ſo much as it is apt to do when a tooth is forced quickly out. This caution, however, is more particularly neceſſary in the extraction of teeth under the circumſtances we are now conſidering; for when the pain originates merely from inflammation, without any part of the tooth being ſpoiled, the roots are always entire, and more firmly fixed, than when the corona of a tooth is moſtly conſumed, and when the roots are always in ſome degree decayed. And beſides, when the pain and inflammation are induced, as we have already remarked, by a ſwelling or enlargement of the fang, and which can never be previouſly diſcovered, if the tooth be turned quickly round, it will for certain break; and the ſwelled part of it being left behind, ſcarcely any advantage will be derived from the operation, while all the pain and diſtreſs with which it is uſually attended will be ſeverely felt by the patient.

On pulling a tooth which does not in any part appear to be carious, we are adviſed by ſome practitioners to replace it and to tie it to the contiguous teeth till it become ſufficiently firm. This I have done in different inſtances; but I think it right to obſerve, that it is a practice which frequently fails, owing, I preſume, to the experiment being tried with teeth in a ſtate of inflammation. I know it will often ſucceed where a tooth has been merely productive of pain, and when no ſymptoms of inflammation have taken place; but whenever the membrane ſurrounding the roots of teeth, or even when the contiguous parts only are much inflamed, it will ſeldom or never ſucceed, while at the ſame time the trial of it will always be productive of much pain and diſtreſs. It ought not therefore to be adviſed indiſcriminately in every caſe, as has frequently been done.

§ 3. *Of Tooth Ach ariſing from Affections of diſtant Parts.*

It is no uncommon occurrence to find all the ſymptoms of tooth ach produced in the moſt ſevere degree, in one, two, or more teeth, where we cannot by the moſt accurate examination diſcover the leaſt appearance of diſeaſe; where we are therefore certain that no part of them is carious, and where there is every reaſon to conclude that the diſeaſe does not originate from inflammation.

In ſuch circumſtances, as the patient is at firſt always unwilling to part with a tooth which in other reſpects appears to be ſound, all the remedies uſually employed in tooth ach are made uſe of; ſuch as bliſters, blood letting with leeches, the application of ardent ſpirits and ſtrong eſſential oils to the pained part, &c. and after being for ſome days tormented with theſe, with little or no advantage, the pulling of the tooth, is recommended as a never failing remedy. Even this ſevere alternative is at laſt ſubmitted to; but unfortunately no benefit enſues from it. The tooth in which the pain ſeems to be moſt ſevere is firſt taken out: But the contiguous teeth becoming ſoon pained in an equal degree, they are from time to time all taken out, till at laſt I have known all the teeth of one ſide of a jaw extracted, and ſtill the pain continue equally ſevere in the gums as at firſt.

In ſuch circumſtances, we will often find, that the pain in the tooth is induced by an affection of ſome other part, and that no remedy will prove effectual that is not directed to the original diſeaſe. It originates in ſome inſtances from rheumatiſm; it has been known to proceed from an arthritic diatheſis; it occurs as a frequent ſymptom in hyſterical affections; pregnant women are frequently liable to it; and it is often found to depend upon a foul ſtate of the ſtomach.

When the pain originates from a foulneſs of the ſtomach, which may be often known by the ſtate of the tongue, as well as other circumſtances, no remedy proves ſo effectual as emetics. I have known the moſt violent tooth ach, which for many weeks had reſiſted the effects of every other remedy, almoſt inſtantaneouſly removed by a vomit: and when the ſtomach is once ſufficiently cleared, a plentiful exhibition of Peruvian bark proves often effectual in preventing a return of it; particularly where the fits of tooth ach have returned periodically, as they ſometimes do, ſo regularly as to give cauſe to imagine that they depend upon a tendency to ague.

In this variety of tooth ach, ariſing from an affection of the ſtomach, no benefit is derived from laudanum. Inſtead of procuring eaſe, it ſeems rather to increaſe the pain, and, by inducing ſickneſs, to render the patient in every reſpect more miſerable. But in theſe varieties of the diſeaſe, originating either from rheumatiſm, from gout, or hyſterical affections, opiates will for the moſt part remove the pain entirely: and a return of it may be frequently prevented merely by keeping the parts ſufficiently warm. In hyſterical patients, a combination of laudanum with ether has ſometimes proved uſeful, when opiates in every other form have failed.

Opiates are often uſed too in tooth ach induced by pregnancy; but ſeldom with advantage. In large doſes indeed they ſometimes procure a ſhort relief from pain; but nothing I have ever tried proves ſo effectual in preventing a return of it as blood letting. A plentiful diſcharge of blood, by the application of leeches to the neighbouring gums, will ſometimes anſwer the purpoſe; but as the pain in caſes of this kind ſeems to originate from a general plethoric ſtate of the ſyſtem, it commonly proves more effectual to empty the veſſels by taking away eight, ten, or twelve ounces of blood from the arm. I have known women immediately relieved by blood letting, who for ſeveral weeks had been liable to very violent degrees of tooth ach, and in whom neither tooth drawing, opiates, bliſters, nor any other remedy, were productive of any advantage.

When a practitioner finds that he has pulled a tooth in the circumſtances we are now deſcribing, where there is neither inflammation nor much caries, he may with much propriety replace it. After clearing the tooth and ſocket entirely of blood, it ſhould be put as nearly as poſſible into its natural ſituation; where it ſhould be tied to the two contiguous teeth till it becomes ſufficiently firm.

SECTION X.

Of TRANSPLANTING TEETH.

THE advantages of a ſound ſet of teeth, both with reſpect to beauty and utility, are ſo great, that we are not ſurpriſed at finding the fertile genius of modern artiſts employed in endeavouring to ſupply the loſs of thoſe which accident or diſeaſe may have occaſioned. The method of ſupplying deficiencies of this kind with artificial teeth, and even of making complete ſets of them, has been long known, and the art has by many dentiſts been carried to great perfection; but the tranſplanting of human teeth from one living body to another is the invention of modern artiſts. The mere propoſal of ſuch a nice operation was entitled to much credit; and in no inſtance does the art of ſurgery appear to more advantage than in rendering the practice of it perfect. It will readily be conceived however that it is not admiſſible in every caſe. Various circumſtances muſt concur to render it practicable; but it may commonly be done wherever it is very neceſſary.

1. As it is in general more with a view to obviate deformity, than to be productive of any real advantage, that the tranſplanting of teeth is practiſed, it is ſeldom conſidered as neceſſary with any of the large molares. Indeed with theſe teeth it could not often take place; for as the roots of them often diverge in a very uncertain manner, and as the number and length of the roots can never be previouſly determined, it would for the moſt part be impoſſible to procure teeth exactly fitted to the vacancies intended to be filled up.

The practice is therefore confined almoſt entirely to the inciſores and canine teeth, although it may be done with nearly an equal certainty in the ſmall molares; for in them the roots are either ſingle, or if there are two fangs they are almoſt always united.

2. In order to enſure ſucceſs, the alveoli and gums muſt be perfectly ſound. They muſt be free from ſcurvy and the lues venerea; nor muſt the patient undergo this operation for a conſiderable time after a ſalivation. The uſe even of a ſmall quantity of mercury frequently leaves ſuch a ſoft ſpongy ſtate of the gums, as renders it improper during the continuance of it to attempt any operation upon them. Hence thoſe who are to have teeth tranſplanted, ſhould carefully avoid even the riſk of contracting any complaint for the cure of which mercury may be neceſſary.* A patient being liable to gum boils has been conſidered as an objection to this operation; but where every other circumſtance concurs to render it proper, it ſhould not be forbid by this: for although it would not probably ſucceed where the ſurrounding ſocket is carious; yet we know that gum boils frequently occur where the ſocket is not in any reſpect diſeaſed.

3. As the ſucceſs of the operation will depend in a great meaſure not only on a ſound ſtate of the alveoli, but on the ſockets being full and complete, it will ſeldom anſwer where teeth have remained long in the ſtate of ſtumps: for in this ſtate the roots commonly waſte away ſo as to loſe conſiderably both of their length and thickneſs; and the alveoli diminiſhing in nearly the ſame proportion, there is not ſufficient ſpace left for the roots of a ſound tooth to be fixed in. It may always, however, be attempted where any conſiderable part of the corona of a tooth is left; for in this caſe the roots, as we have formerly remarked, are uſually complete, however extenſively the caries may in other reſpects have ſpread.

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* This caution is particularly inculcated by the very ingenious Mr. John Hunter, in his Treatiſe on the Diſeaſes of the Teeth, page 98.

4. It is in youth and middle age only that this operation is admiſſible. In childhood and old age it ſhould not be attempted. In childhood it is not probable that a tooth put in, in this manner, would ever become firm, as the approaching tooth of the ſecond ſet would always be acting againſt it; and beſides, as any vacancy produced at this period will be filled up when the ſecond ſet comes forward, it can never be in any reſpect neceſſary. In old age again, two ſtrong objections occur to it. At this period the ſockets of the teeth are commonly much diminiſhed, particularly in depth: and in old age, when many of the ſmaller blood veſſels become obliterated, it is not probable that any tranſplanted tooth, whether taken from a dead or a living ſubject, would ever become ſufficiently firm: For, when the operation ſucceeds, as there is always a firm union produced between the tooth and the contiguous parts, by means of blood veſſels paſſing from one to the other, we are led to imagine that this is neceſſary for the ſucceſs of it. Now this, for the reaſon mentioned above, can never happen to any extent in advanced periods of life.

5. The tranſplanted tooth ought to fit the ſocket in every point as exactly as poſſible: but it ſhould not require much force to inſert it; for if it be in any degree larger, either in length or thickneſs, it will create a great deal of unneceſſary pain. The irritation produced by it will probably terminate in ſuppuration; and in this manner the operation will be rendered abortive. Several people therefore ſhould be provided for the purpoſe of furniſhing teeth; ſo that the operator may have no difficulty in finding one of a proper ſize: and it will frequently happen, that a tooth of the ſame ſize taken from one perſon, will fit the ſocket of the ſame tooth in another perſon very exactly. When it is found, however, that the roots of the tooth newly pulled are either too long or too thick for the ſocket in which they are to be placed, they ſhould be filed down till they go eaſily in; for it is not found

that the removal of a ſmall part of the root prevents the ſucceſs of the operation. And care ſhould be taken to make the ſurface of the tranſplanted tooth ſomewhat lower than the level of the contiguous teeth, ſo that no inconvenience may occur from thoſe in the oppoſite jaw preſſing againſt it. There is no neceſſity, however, for this difference being ſo conſiderable as to be very perceptible ; for the ſmalleſt difference will anſwer the purpoſe, and a greater degree of it will always be attended with ſome deformity.

But although we have ſaid that the roots of teeth to be tranſplanted may be leſſened with a file, no part of the corona ſhould be touched with it. It is ſometimes indeed done by dentiſts, and it may in ſome inſtances ſucceed ; but as it muſt always be attended with ſome riſk of the tooth becoming carious, it ſhould never be adviſed ; and this eſpecially as a very little attention will render it at all times unneceſſary : for although we may be miſtaken with reſpect to the ſize of the roots of a tooth, we have it always in our power to determine with exactneſs, whether the upper part of the tooth to be pulled will fit the vacancy or not.

6. In taking out the new tooth and removing the old one, much care and attention is neceſſary ; for if the new tooth be much broke, or if the ſocket in which it is to be placed be much injured, the operation will not probably ſucceed. When it is poſſible therefore to take out the old tooth with the forceps, it is better to do it in this manner than with the key inſtrument, which can ſcarcely be uſed without injuring the parts too much.

7. When the tooth is removed, the ſocket cleared of blood, and the new tooth inſerted under the reſtrictions we have mentioned, we are next to endeavour to keep it firmly fixed till an adheſion ſufficient for retaining it takes place between it and the neighbouring parts. This muſt be done by tying it to the two contiguous teeth, and by much attention on the part of the patient to do nothing that can probably looſen it. In

tranſplanting a canine tooth, the ligature, which ſhould be made of ſeveral plies of fine ſilk properly waxed, ſhould be firſt tied round the upper part of the new tooth, immediately above where it begins to ſwell; and on the tooth being properly placed, it ſhould be tied to the two contiguous teeth, taking care to paſs the ligature as near as poſſible to the gums. But when an inciſor or ſmall molaris is tranſplanted, it anſwers better to fix the ligature firſt to the contiguous tooth near to the junction of the gums, and then to paſs it over the ſurface of the new tooth, and bringing it again back, to fix it where it commenced, round the necks of the other teeth. In this manner the tranſplanted tooth is pulled down by the ligature into the ſocket; but much attention is neceſſary in this part of the operation to prevent it from being drawn too much either to one ſide or another; for nothing more certainly prevents it from proving ſucceſsful than the new tooth being made to preſs upon either of the contiguous teeth. This, however, will never happen in the hands of an expert artiſt who has been ſufficiently accuſtomed to this branch of practice; nor can it happen with any who is properly warned of the conſequences that may enſue from it.

When the ligatures are properly fixed, they may not perhaps need to be renewed; but when they either ſlip off accidentally, or become in any degree looſe, they ſhould by all means be renewed immediately; and the patient ſhould be conſtantly on his guard to avoid whatever might in any degree looſen or ſhake the tooth. Nor is it ſufficient to attend to this for a few days only: the ſame kind of caution muſt be perſiſted in till the tooth becomes perfectly firm; and the length of time neceſſary for this will depend on the circumſtances of every caſe: on the particular ſtate of the alveoli; on the age and habit of body of the patient; and on the operation being done with more or leſs exactneſs. In ſome caſes a tooth will become perfectly firm in the ſpace of eight or ten days: while in others it will remain ſomewhat looſe for two or three months. During all this period the patient ſhould live as much as poſſible upon ſpoon meat : and he ſhould guard particularly againſt cold ; for nothing renders the ſucceſs of this operation liable to ſo much hazard as expoſure to cold or dampneſs.

The moſt important objection that has been ſtarted to the tranſplanting of teeth, is the riſk with which it is attended of communicating diſeaſes ; and I muſt own that *à priori* it appears to be a very material one. It has not, however, been found on experience to be ſufficient to counterbalance the advantages which are ſuppoſed to be derived from this operation : for it is daily practiſed ; and we ſeldom hear even of any ſuſpicion of infection being carried into the ſyſtem by it. I am not, however, of opinion, with thoſe who think that diſeaſes cannot be communicated in this manner. On the contrary, I think thoſe practitioners do not deſerve to be employed, who treat a matter of ſuch importance to their patients with indifference. Teeth for the purpoſe of tranſplanting ſhould never be taken from people with any appearance whatever of diſeaſe. Thoſe only ſhould be uſed which are taken from conſtitutions in which there is every poſſible evidence of health ; and with a view to prevent as much as it can be done, every riſk of infection being conveyed in this manner, the tooth to be tranſplanted ſhould be immerſed for a few ſeconds in luke warm water, and ſhould afterwards be entirely cleared of any blood or matter that may adhere to it, by rubbing it gently between the plies of a piece of ſoft old linen.

There is reaſon indeed to imagine, from the reſult of ſome experiments made with a view to inoculate the meaſles, as well as ſome other diſeaſes, with the blood of thoſe infected with them, that infection cannot be communicated in this manner. But the point is by no means ſo certain as to warrant our placing much dependence upon it.

SECTION XI.

Of the RANULA.

WE frequently find tumors of different degrees of conſiſtence ſeated beneath the tongue, ſometimes on one ſide, and at others on both ſides, of the frænum; which in general are diſtinguiſhed by the term Ranula. They are ſeldom attended with much pain; but they become ſo large in ſome inſtances as to impede the ſucking of infants, and the maſtication, and even the ſpeech, of adults. In ſuch circumſtances, the aſſiſtance of ſurgery becomes neceſſary in the treatment of them.

In ſome caſes, tumors of this kind contain a fatty kind of matter: This, however, is rare; and for the moſt part, perhaps in nineteen caſes of twenty, they are filled almoſt entirely with a thin limpid liquor very much reſembling ſaliva; and we find, on cutting into them, that they are often produced by a ſtoppage of the ſalivary ducts from calculous concretions forming in them. They ſometimes arrive at conſiderable degrees of magnitude; but in general the tumor burſts when of the ſize of a large nut, leaving an ulcer which is commonly difficult to heal, if the real cauſe of the diſeaſe be not diſcovered and removed. I have known an ulcer of this kind treated with much attention for the ſpace of ſeveral months—various detergent and even corroſive applications being employed for it; nay, in one inſtance a long mercurial courſe was adminiſtered, but with no advantage whatever; and at laſt, on the true origin of the diſorder being found out, it was cured in the ſpace of a few days, merely by removing a portion of hard calcareous matter, which, by ſtopping the natural paſſage of the ſaliva, firſt produced the tumor, and afterwards prevented the ulcer, in which it terminated, from healing. In ſome inſtances concretions of this kind are ſmall, not larger perhaps than the head of a middle ſized pin; whilſt in others they are large. I have in different inſtances found them of the ſize of a kidney bean.

In every tumor of this kind that is not of a firm conſiſtence, the moſt effectual mode of treatment is to lay it open with a ſcalpel from one end to the other; by which any calcareous particles contained in it are eaſily diſcovered; and theſe being removed, the remaining ſore commonly heals eaſily. There is no neceſſity for waſhing the ſore, as we are generally adviſed, with tincture of bark and other aſtringents: on the contrary, warm water and other emollients anſwer better, by waſhing out more effectually any particles of ſtone that may not have been previouſly diſcovered. When indeed the ſore proves afterwards difficult to heal, the others may ſometimes be employed with advantage.

The ſame kind of management ſhould be purſued in the treatment of old fiſtulous ſores of theſe parts. In almoſt every caſe where the diſeaſe is ſeated in any of the ſalivary glands or ducts, it will appear to be kept up by the cauſe we have mentioned, namely a ſtoppage of the duct by a particle of ſtone; and the removal of this, by making an inciſion upon it, and turning it out with a probe or a ſcoop, will very commonly accompliſh a cure.

When, again, tumors in this ſituation are of a fatty or even of a firmer conſiſtence, inſtead of making an inciſion into them, they ſhould be extirpated entirely; and unleſs they lie deep, and are of a large ſize, it may always be done with ſafety. Practitioners are very properly indeed afraid of hemorrhagies in this ſituation; for as the arteries lie deep, it is always difficult, and moſt frequently impoſſible, to ſecure ſuch of them with ligatures as happen to be cut. But any tumor of this kind that is looſe, and not deeply attached to the contiguous parts, may be taken out without any riſk from ſubſequent hemorrhagies; for as the ſuperficial arteries of theſe parts are ſmall, any diſcharge that occurs from them, in general, ſtops by the application of ſpirit of wine, alcohol, or tincture of myrrh. In more violent hemorrhagies, it would no doubt be proper to employ the potential or even the actual cautery; but theſe means are ſeldom neceſſary.

In removing tumors of this kind by diſſection, where they lie ſo deep that they cannot be eaſily laid hold of with the fingers, the common ſmall forceps is uſually employed; but a ſmall hook with two fangs, ſuch as is repreſented in Plate L. fig. 3. anſwers better.

SECTION XII.

Of ULCERS *of the* MOUTH *and* TONGUE, *and extirpation of the* TONGUE.

THE tongue and other parts within the mouth are liable to all the variety of ulcers incident to other parts of the body; and we need ſcarcely remark, that the treatment of them ſhould be nearly ſimilar. When they ſeem to originate from the lues venerea, ſcrophula, or ſcurvy, our views ſhould be chiefly directed to the cure of the general diſorder of the ſyſtem; while, on the contrary, local applications only ſhould be employed, when they appear to be of a local nature.

Beſides other cauſes of ulcers, however, to which theſe parts are liable, it is proper to obſerve, that there is one to which they are more particularly expoſed, and which appears to give riſe to the greateſt part of them, namely, ragged teeth. I have known very troubleſome ſores not only produced, but kept up for a great length of time, on the ſides of the tongue, and on the inſides of the cheeks, by the ſharp points of broken or carious teeth; and as long as the rough part of a tooth, which has once induced a ſore of this kind, is allowed to remain, no remedy whatever will heal the ſore. In every caſe therefore of ulcer in the mouth, we ſhould inquire with much attention into the ſtate of the contiguous teeth; and when any of them are found to be rough and pointed, they ſhould be made as ſmooth as poſſible with one of the ſmall files, Plate LXIII. fig. 5 or 6. Or when the ſore appears to be induced by the formation of tartar upon the teeth, it ſhould be effectually removed in the manner we have already adviſed in the eighth ſection of this chapter.

The removal of the cauſe is for the moſt part ſoon followed by a cure of the ſore; but when this fails, we frequently derive ſome advantage from waſhing the mouth with gargles compoſed of decoctions of bark, a ſolution of alum, lime water, infuſions of red roſe leaves, of oak bark, and other aſtringents.

In ſome caſes, however, the ſores become worſe, notwithſtanding the uſe of theſe, mercury, and every other remedy. They become ragged and unequal about the edges; they diſcharge a thin, fetid ſanies; and in this ſtate they are commonly attended with much pain.

As long as a ſore of this kind remains ſmall, without ſhowing any tendency to ſpread, there is in general reaſon to expect a cure; and therefore any violent remedy is conſidered as unneceſſary: But whenever a ſore has aſſumed the appearances we have enumerated, and when it does not yield to any of the means we have mentioned, as there will be little or no cauſe to doubt of its being of a cancerous nature; we ſhould certainly adviſe it to be removed by extirpation, and it ought to be done without farther delay.

A cancerous ſore, whether it be ſeated on the tongue, or on the inſide of the cheek, if it is only ſuperficial, and does not run deep, may be extirpated with eaſe and ſafety; but when the ſubſtance either of the cheek or of the tongue is much affected, it becomes an object of more importance, as being attended both with difficulty and hazard. Whatever the riſk may be, however, if the diſeaſed parts can be all removed, the operation ſhould certainly be adviſed; for as we know of no other remedy upon which any dependence can be placed for the cure of cancer, it is ſurely better to ſubmit to ſome riſk than to be left to certain miſery.

When a deep ſeated cancer in the cheek is to be removed, the eaſieſt and moſt effectual method of doing it is to make an inciſion through the whole ſubſtance of the cheek, commencing at the contiguous angle of the mouth, and ending at the ſame part, after ſurrounding the ſore: The diſeaſed parts being thus entirely removed, the ſides of the cut muſt be laid as neatly as poſſible together; and a number of gold pins being introduced at proper diſtances along the courſe of it, a cure will in this manner be completed by the twiſted ſuture, in a manner ſimilar to what is employed for the hare lip, deſcribed in Sect. I. Chap. XXX. In this way very extenſive cancerous ſores may be removed without leaving much deformity; while a very diſagreeable unſeemly cicatrix is always left after the uſual method of doing this operation, by removing the diſeaſed parts only, and allowing them to heal without drawing them together by ſutures.

In removing any conſiderable part of the tongue with the ſcalpel, as the hemorrhagy which enſues is the only occurrence from whence any danger is to be dreaded, the operator ſhould be previouſly provided with all the ordinary means of putting a ſtop to it. When ligatures can be paſſed round the divided arteries, no other remedy ſhould be truſted; and this, we may remark, may be done more frequently, and at a greater depth in the mouth, than is commonly imagined. As the tongue can be puſhed a conſiderable way out of the mouth, ligatures may be applied for this purpoſe, even when a good deal of it has been taken away, merely with the common tenaculum, or with crooked needles; but when this does not anſwer, it may ſometimes be done in a manner ſimilar to what we have deſcribed in Sect. V. Chap. XXVIII. for the removal of ſcirrhous tonſils. A ligature being paſſed round the artery with the needle uſed in fig. 3. Plate LI. it may then be tightly twiſted by paſſing the two ends of it through the double canula, fig. 1. Plate

XLIV. or a knot may be formed upon it with the inſtrument, fig. 2. Plate LI.

When, however, it is found to be impracticable to ſurround the divided arteries either in this way or in any other manner, we muſt endeavour by ſome other means to put a ſtop to the hemorrhagy. If the veſſels are not large, keeping the mouth filled with aſtringent gargles, either of alcohol, a ſtrong ſolution of alum, diſtilled vinegar, or water ſtrongly impregnated with the vitriolic acid, will often anſwer: But when theſe do not ſucceed, the potential, or even the actual cautery, muſt be employed as the laſt reſource.

The removal of any conſiderable part of the tongue we muſt allow to be a very formidable operation: as ſuch it has been always conſidered; and accordingly it has been rarely practiſed. But, for the reaſons mentioned above, I have no heſitation in ſaying, that it is ſometimes neceſſary, and in general that it may be done with ſafety. It ought not, however, to be attempted by every operator; for as it is always attended with a ſudden diſcharge of blood, the application of means proper for the ſtoppage of this, obviating the effects of fainting, and other unexpected difficulties, which ſometimes occur, require that ſteady deliberate coolneſs which a natural firmneſs of nerves, conjoined with much experience, alone can give.

SECTION XIII.

Of the Diviſion of the FRÆNUM LINGUÆ.

IT is ſometimes found in children at birth, that the tongue is too cloſely tied down to the bottom of the mouth, owing to the frænum being either too ſhort, or continued too near to the point of it. The method of cure is obvious. This membrane or ligament muſt be divided ſo as to allow the tongue to have a free eaſy motion; and it ſhould be done as ſoon as it is obſerved to be neceſſary, otherwiſe the ſucking of the child may in the firſt place be impeded, and afterwards an interruption to ſpeech may ariſe from it.

It is proper, however, to obſerve, that it is not a common occurrence; for although nurſes often ſpeak of children being tongue tacked, who either do not ſuck readily, or that are backward in ſpeaking, an attentive practitioner will ſeldom diſcover it.

The diviſion of this membrane is an eaſy operation; but it muſt be done with attention, otherwiſe the contiguous blood veſſels will be apt to be injured, by which ſuch a quantity of blood may be loſt as might prove hurtful to an infant: It is commonly done either with a ſcalpel or with common ſciſſors; but it is done both with more eaſe and ſafety with the inſtrument, fig. 3. Plate LXII. The child being laid acroſs the nurſe's knees, the ſurgeon ſhould open the mouth and elevate the tongue with the index and middle finger of his left hand, while with the other he muſt introduce the inſtrument, ſo as to receive the middle of the frænum into the ſlit, which he may now divide with ſafety to any neceſſary depth.

SECTION XIV.

Of the Diviſion of the PAROTID DUCT.

THE parotid gland of each ſide tranſmits the liqour which it ſecretes by a duct of the ſize of a crow's quill, which, after paſſing over part of the maſſeter muſcle, penetrates the buccinator in an oblique direction, and empties itſelf into the mouth about the middle of the cheek.

In the operation which we have juſt deſcribed, of extirpating cancerous ſores from the cheek, as well as by various accidents, this duct is apt to be cut; and if the two divided ends of it be not retained together till they heal, it often happens that the whole quantity of liquor which it ought to convey to the mouth is poured over the cheek; and the diſcharge being conſtantly kept up, the ſore is thus prevented from healing, and a fiſtulous opening left correſponding to the ſize of the duct. As the ſore commonly heals altogether internally, the diſcharge would neceſſarily continue during life, if means were not uſed for preventing it.

In the caſe of a recent diviſion of this duct, the beſt practice is to lay the two ends of it as exactly together as poſſible, and to retain them in this ſituation till they are united; by adheſive plaſters, when this proves ſufficient; or by the twiſted ſuture, when the retraction of the divided muſcle is conſiderable: But when this has either been neglected at firſt, or when it fails of ſucceſs, as the diſtant extremity of the duct ſoon heals, and is entirely obliterated at the divided end of it, owing to none of the fluid ſecreted by the gland paſſing through it, the only way in which a cure can be obtained is to make an artificial opening into the mouth, and to endeavour to form an union between it and the upper part of the duct leading from the parotid gland.

In making a paſſage of this kind, we ſhould carry it as much as poſſible in the direction of the natural duct; but in order to inſure the ſucceſs of it, it ſhould be rather of a larger diameter than the other. For this purpoſe a ſharp pointed perforator of a proper ſize ſhould be entered on the other ſide of the ſore, exactly oppoſite and contiguous to the under extremity of the ſuperior part of the duct; and being carried with ſome degree of obliquity, it muſt in this manner be made to penetrate the mouth. This being done, a piece of lead probe, exactly the ſize of the perforator, ſhould be introduced along the courſe of the newly formed opening, to be retained in it till the ſides of it become callous; when, the lead being withdrawn, the extremity of the duct ſhould be drawn into contact with the ſuperior part of the artificial opening by means of a piece of adheſive plaſter, and kept in this ſituation till a firm union has taken place. After taking out the lead, we have it in our power to forward the cure, by rendering the end of the duct and of the newly formed opening raw with the edge of a lancet or ſcalpel, before bringing them together. Till a firm adheſion takes place between them, the patient ſhould be directed to live upon ſpoon meat; to ſpeak little or none; and to make as little exertion with his jaws as poſſible.

In this manner, ſores, which would otherwiſe continue to diſcharge ſaliva for life, may be eaſily healed, with ſcarcely any mark of their having ever exiſted. I have had three different inſtances of it; in all of which complete cures were obtained. A common ſeton or cord of cotton has been recommended for this operation inſtead of lead; and a bit of catgut has been uſed inſtead of it: but nothing renders the parts ſo quickly callous as lead; and beſides, it is more cleanly than a cord or tent of any ſofter ſubſtance.

CHAPTER XXXI.

Of the DISEASES *of the* EARS *and Operations practiſed upon them.*

SECTION I.

Of DEAFNESS.

DEAFNESS may proceed from various cauſes: for as a free paſſage of ſound to the Tympanum or Drum of the ear, together with a ſound ſtate of this membrane and of the parts connected with it, are requiſite for the ſenſe of hearing, ſo whatever tends to obſtruct the one, or to induce diſeaſes of the other, will neceſſarily be productive of more or leſs deafneſs.

There are two paſſages for the purpoſe of conveying ſound to the ear; one of them termed the Meatus Externus, terminating in the external ear; and the other the Tuba Euſtachiana, ending in the throat. It is true that the firſt of theſe is of more importance than the other, for it is larger, and more conveniently placed for collecting ſound: but it is certain that the latter or internal paſſage is a very neceſſary part of the organ of hearing; for when by any means it is ſtopped, deafneſs to a greater or leſſer degree almoſt conſtantly enſues. Thus we obſerve, that any preternatural fulneſs or enlargement of the amygdalæ, eſpecially when they are attacked with inflammation, is always attended with ſome degree of deafneſs. In this way, too, we account for that deafneſs to which patients are liable who have ſuffered much from venereal ulcers in the throat; and polypous excreſcences which extend back from the noſe and fauces, by compreſſing the Euſtachian tube, are frequently productive of a ſimilar effect.

In that variety of deafneſs which originates from this cauſe, a removal of the polypus, or of the ſwelled amygdalæ, will frequently accompliſh a cure, while no other remedy will be of any utility. But when the diſeaſe is the conſequence either of an ulcerated ſtate of theſe parts, or of much inflammation, as the extremity of the duct will probably be obliterated, it would be in vain to employ any means whatever. It has indeed been propoſed in this variety of obſtruction, to endeavour to open the duct, by inſerting the end of a curved blunt probe into it, or even to inject milk and water, or any other mild fluid, into it with a curved ſyringe. But although a perſon well acquainted with the anatomy of the parts, may, by much practice, arrive at ſuch perfection as to be able to do this with little difficulty upon a dead body, there is ſcarcely any reaſon to imagine that in practice any advantage will be derived from it: for even in a healthy ſtate of theſe parts, the irritation produced by the end of a probe or of a ſyringe muſt be ſo conſiderable as to render every attempt for inſerting them, very uncertain; and the difficulty muſt neceſſarily be greatly increaſed where the extremity of the duct is obſtructed by diſeaſe. But if we have not much in our power in the treatment of deafneſs ariſing from this cauſe, we are in many inſtances able to afford much relief, and even to reſtore the moſt perfect hearing where it has been entirely wanting, when the diſeaſe proceeds from obſtruction in the external paſſage of the ear.

The meatus externus may be obſtructed in various ways. It may be in an imperforated ſtate at birth;—it may be more or leſs filled with extraneous bodies forced into it;—tumors or excreſcences may form in it;—and it may be too much ſtuffed with wax, the natural ſecretion of the part. As each of theſe cauſes requires a method of treatment peculiar to itſelf, we ſhall conſider them under ſeparate heads.

§ 1. *Of an Imperforated Meatus Auditorius.*

Among other natural deficiencies to which the human body is liable, none occurs more frequently than an imperforated ſtate of ſome of the paſſages. This is not ſo frequently met with in the Meatus Auditorius as in others, owing perhaps to the lining membrane of this paſſage being every where attached to bone, by which it is prevented from collapſing. Notwithſtanding, however, different inſtances have occurred of it, and ſome variety is diſcovered in the nature of it.

In ſome caſes the obſtruction is formed by a thin membrane ſpread over the mouth of the paſſage; while in others a conſiderable part of the conduit is entirely filled with a fleſhy kind of ſubſtance.

In the treatment of this variety of deafneſs, nothing, it is evident, can be of any advantage but the removal of the cauſe by an operation. When this is determined upon, the patient's head ſhould be ſecured in a proper light, and at a convenient height, by an aſſiſtant; when the operator, with a ſmall ſharp pointed biſtoury, ſhould make an inciſion of a proper length exactly on the ſpot where the external paſſage of the ear ſhould terminate. If it is covered by a membrane only, the operation will ſoon be finiſhed; but when it is impervious to any great depth, the inciſion muſt be continued, by paſſing the biſtoury in a gradual manner farther in, either till the reſiſtance is entirely removed, or till there is reaſon to fear that the tympanum would be hurt, if it were carried deeper: In which caſe the inſtrument ſhould be withdrawn; and in order to prevent the parts from adhering together, a bit of bougie properly oiled ſhould be introduced, and retained till the cure is completed; care being taken to remove it daily for the purpoſe of cleaning it, and for wiping off any matter that may have collected in the ear.

In this manner deafneſs depending upon this cauſe may often be removed when the obſtruction lies between the tympanum and the farther extremity of the external paſſage; and it ſhould be always attempted about the time when the child ſhould be beginning to ſpeak. At a more early period the child would not be ſo able to bear it; and when delayed much later the ſpeech would be impeded; for we know that dumbneſs depends more frequently on a want of hearing than on any other cauſe.

§ 2. *Of Extraneous bodies impacted in the Ear.*

Although the viſcid nature of the wax of the ears is well calculated for preventing duſt and other foreign matters from getting acceſs to them, yet we know that much diſtreſs is in ſome inſtances induced by this cauſe. Children often puſh ſmall peas, cherry ſtones, lead drops, and other ſuch articles into their ears, and flies and other inſects frequently creep into them.

When theſe lie near to the extremity of the paſſage, flies and other things that can be laid hold of ſhould be extracted with ſmall forceps, ſuch as are delineated in Plate LXI. fig. 2. But peas and other round bodies are more eaſily removed, by turning them out with the end of a curved probe, or paſſing the inſtrument, Plate XLII. fig. 1. behind them; and their extraction is facilitated by a little oil being previouſly dropped into the paſſage.

When inſects have got ſo far into the ear that they cannot be taken out with forceps, the beſt method of removing them is to waſh them out, by throwing in quantities of warm water, or any other mild liquid, with a ſyringe; but as they adhere while living with conſiderable firmneſs to the neighbouring parts, we ſhould firſt endeavour to kill them, by filling the ear with oil, or any other liquid that proves poiſonous to them, without injuring the tympanum. Lime water, ſpirit of wine, and many other articles, might be employed for this purpoſe: but nothing proves ſo harmleſs as oil; and although it does not kill every ſpecies of inſect inſtantaneouſly, yet few of them will live if immerſed in it for any length of time. The patient ſhould therefore be deſired to reſt his head upon the oppoſite ſide; and ſome tepid oil being poured into the affected ear, it may thus be eaſily kept in it as long as may be neceſſary.

Peas and other ſoft bodies which ſwell with moiſture, are apt to become ſo large when they remain long in the ear, that they cannot but with much difficulty, be extracted entire. In this caſe we ſhould endeavour to break them, either with the points of ſmall forceps, or with a ſharp ſmall hook cautiouſly introduced along the paſſage; and as ſoon as they are ſufficiently divided, they muſt either be taken out piecemeal with the forceps, or waſhed out with a ſyringe.

§ 3. *Of Excreſcences in the Meatus Auditorius.*

We have already treated of polypi in the noſe and throat; and we may now remark, that the external paſſage of the ear is equally expoſed to them. It is not indeed common for excreſcences of this kind in the ear to arrive at ſuch a bulk as they do in the noſe; but whoever has paid attention to this branch of practice, will acknowledge that they are by no means unfrequent, and they often appear to be the cauſe of very obſtinate deafneſs.

On examining the Meatus Auditorius, we ſometimes find it filled with a polypous excreſcence hanging looſe by one pedicle; while on other occaſions the paſſage is obſtructed merely by a thickneſs or fullneſs of the lining membrane of the ear, when no particular part of it appears to be more affected than another.

As the polypi of this part are uſually of a firmer texture than thoſe excreſcences which occur in the noſe, and as the membrane of the ear is firm, and does not readily yield, they cannot with propriety be extracted with the forceps; but they may be taken out either with the knife or by ligature. When they lie near to the external paſſage of the ear, and can be laid hold of either with ſmall forceps, or with the diſſecting hook, Plate L. fi. 3, they may be eaſily cut out with a probe pointed biſtoury, ſuch as is repreſented in Plate LII. fig. 3. and as they do not appear to be ſo vaſcular as ſimilar excreſcences in the noſe, they may in this manner be removed with ſafety; for they ſeldom diſcharge much blood. But when they lie deep, it is better to remove them with ligatures; for as the paſſage is ſtraight, a knife is in this ſituation introduced with difficulty and uſed with uncertainty.

Various methods have been propoſed of applying ligatures to excreſcences in this ſituation; but the method of removing polypi of the noſe, deſcribed in the explanation of Plate XLVI. appears to be more adviſable than any of them. With the forked probe, fig. 2. the doubling of a ligature may be puſhed up at one ſide of a polypus till it reaches the root of it; and the two ends of the thread being carried round the excreſcence, and inſerted into a ſhort double canula, ſuch as is delineated in Plate XLIV. fig. 1. the canula muſt now be puſhed to the root of the polypus on the oppoſite ſide; when the two ends of the ligature being drawn ſufficiently tight, and fixed upon the knobs at the end of the tube, the probe may be withdrawn, and the polypus in all probability will drop in a day or two.

But it often happens, that theſe excreſcences cannot be removed in this manner; for inſtead of being pendulous by a ſmall neck, they frequently extend a conſiderable way along the lining membrane of the ear. In this caſe eſcharotic applications have been recommended: but as they cannot be employed but with much riſk of hurting the tympanum, they ſhould never be uſed; and this eſpecially as the diſeaſe may in general be removed by means of a more ſimple nature. This affection of the membrane of the ear I conſider to be very ſimilar to that variety of obſtruction in the urethra in which bougies prove particularly uſeful; and the ſame remedy, when duly perſiſted in, proves equally ſerviceable in the one diſeaſe as in the other. In the introduction of the bougie, care muſt be taken not to paſs it to the depth of the tympanum, otherwiſe it may do more harm than good; and the ſize of it muſt be enlarged from time to time till the paſſage is rendered ſufficiently open.

When bougies are firſt paſſed into the ear, they are apt to create ſome degree of uneaſineſs, by irritating the parts to which they are applied; but this ſoon ſubſides when they are employed with caution, and properly oiled before being introduced.

§ 4. *Of Deafneſs from Wax collected in the Ears.*

Whether it be from the lining membrane of the ear being poſſeſſed of ſome degree of a contractile power, or from the outward extremity of the paſſage being ſomewhat lower than the other, that the cerumen or wax does not uſually lodge in it is perhaps difficult to determine; but it is certain, that in a healthy ſtate of theſe parts they are for the moſt part only thinly covered with this ſecretion: ſo that it does not appear ſurpriſing that deafneſs ſhould enſue when it is collected in large quantities; for in this ſtate it very effectually obſtructs the paſſage of ſound to the tympanum. It commonly happens too when wax remains long collected in the ear, that it becomes thick, and even hard, inſomuch that in ſome inſtances it becomes almoſt as firm as a bit of timber.

The treatment of this variety of deafneſs is very obvious. By an attentive examination of the ear, we can diſtinguiſh with certainty whether there be a ſuperabundance of wax or not: for by placing the ear in a clear ſunſhine, we can ſee even to the tympanum; and whenever it is obſerved that the paſſage is much obſtructed with wax, we ſhould not heſitate in adviſing it to be removed.

Different methods have been propoſed for clearing the ears of wax; but the ſafeſt and eaſieſt is by waſhing or ſyringing with warm water or any other mild liquid, ſo as to force out all the ſtuff that is collected. Milk and water, or ſoap and water, anſwer the purpoſe as well as any other article: but before the operation a few drops of oil ſhould be poured into the ear, not with a view to diſſolve the wax, for more powerful ſolvents of this ſubſtance might be mentioned; but for the purpoſe of lubricating the paſſage, by which it is more eaſily forced out. By a proper uſe of the ſyringe, which a little experience will teach, the ears may be effectually cleared of every obſtruction proceeding from wax.

Although obſtruction of the external paſſage of the ear is the moſt frequent cauſe of deafneſs; yet it is proper to know, that in ſome inſtances it is produced in a different manner. It may occur from a morbid ſtate of the tympanum, and of the parts contained within it. To a certain degree it will take place, if either by accident or diſeaſe the external parts of the ear be deſtroyed; and it ſometimes occurs from a deficiency of wax.

In ſcrophulous conſtitutions the ſmall bones of the ears ſometimes become diſeaſed; in conſequence of which, a great degree of deafneſs is produced which is never in any inſtance removed. In ſuch caſes all that art can do, is to preſerve the parts clean and free from ſmell, which is moſt effectually done by waſhing out any matter that may collect in the paſſage, morning and evening, by throwing in a little warm milk and water with a ſyringe: for if this be not attended to, the matter diſcharged from the carious bones is apt to become offenſive; and it commonly ſubſiſts either till the diſeaſed parts of the bones are entirely diſſolved and diſcharged, or perhaps during the life of the patient.

We ought not, however, to confound this diſeaſe with a diſcharge which frequently takes place from the ears, of a milder nature. In ſome caſes it appears to be the conſequence of a bile or abſceſs in the meatus externus; while in others it occurs without any previous impoſthume, and ſeems to be induced by ſome ſlight inflammatory affection of the lining membrane of the ear, or perhaps of the tympanum itſelf.

This is a very common occurrence, and for the moſt part I think it is improperly treated. In general it is ſuppoſed to originate from morbid humours in the ſyſtem; ſo that ſome riſk is ſuppoſed to attend any attempt that may be made for ſtopping it.

This however is an erroneous idea. In moſt inſtances it may be traced to the cauſe I have mentioned, an inflammatory affection of the membrane of the ear; which being of a local nature, no riſk can enſue from checking it. And accordingly I very commonly treat it with injections of a moderately aſtringent nature, nearly ſuch as often prove effectual in putting a ſtop to the diſcharge of a gonorrhœa. A weak ſolution of alum, or of ſaccharum Saturni, frequently anſwers, or French brandy ſomewhat diluted. In ſome caſes, putting a few drops of any of theſe into the ears, mroning and evening, will prove ſufficient; but when this fails, they may be gently thrown in with a ſyringe.

It is proper to remark, that the earlier in the diſeaſe this practice is employed, the more effectual it uſually proves; ſo that it ſhould never be long delayed. And beſides, when the diſcharge has been of long duration, it is not only apt to do harm, by relaxing, or even deſtroying the tympanum, but ſome riſk may occur from putting a ſudden ſtop to an evacuation to which the ſyſtem has been for ſome time accuſtomed. The danger, however, may be obviated by the previous introduction of an iſſue ſomewat adequate to the diſcharge from the ear, either in the head, neck, or any other part; but in recent caſes of this kind there is no neceſſity for putting the patient to any of the inconveniencies with which an iſſue is ſometimes attended; for here the diſcharge may with ſafety be ſtopped immediately.

When

PLATE LXIV.

FIG. 1.

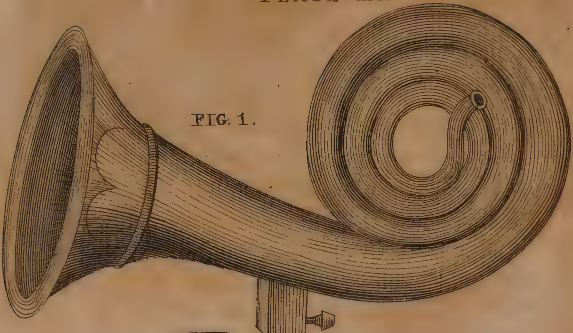


FIG. 2.

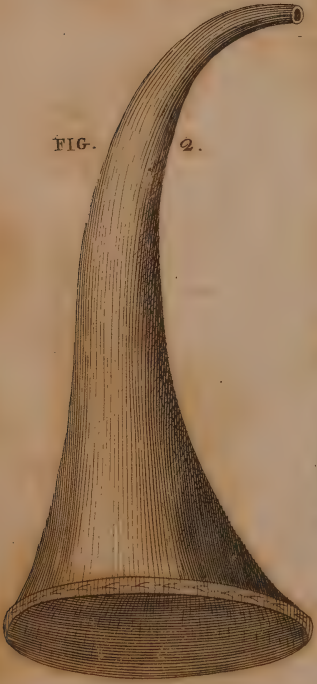


FIG. 3.

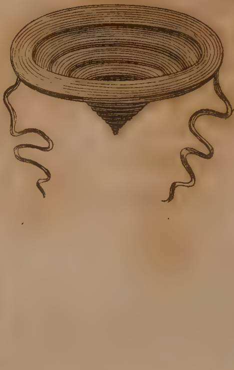


FIG.

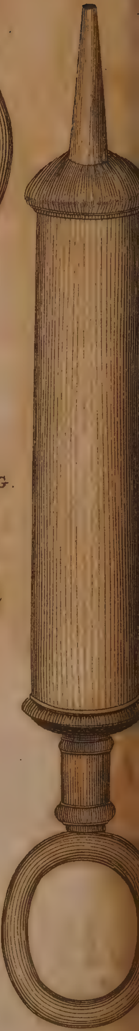


FIG. 5.

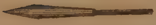
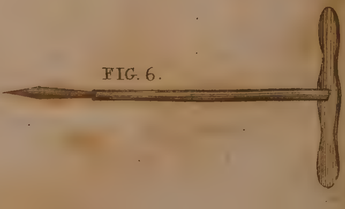


FIG. 6.



When deafneſs occurs either from relaxation of the tympanum, or from any deficiency in the external parts of the ear, ſome aſſiſtance may be derived from our endeavouring to collect or concentrate ſound, ſo as to make a ſtronger impreſſion on the organ of hearing. Various inſtruments have been invented for this purpoſe; but none of them anſwers ſo well as one nearly of the form of a common horn, ſuch as is repreſented in Plate LXIV. fig. 2. Figure 1. is a convoluted tube employed for the ſame purpoſe; and fig. 3. repreſents an inſtrument intended to be concealed beneath the hair or wig, and to be fixed to the head by the two ſtrings connected with it.

When, again, a deficiency of wax is ſuſpected to be the cauſe of deafneſs, dropping a little oil of almonds, or any other mild oil into the ear, once or twice daily, proves ſometimes uſeful. In ſome caſes too I have known advantage derived from inſerting a little ſoft ſoap into the paſſage; which not only keeps it moiſt, but by acting as a ſtimulus to the lining membrane of the ear, tends thus to induce a return of the ſecretion of wax. With the ſame view too, I have ſometimes employed ſtrained galbanum made into a proper conſiſtence with oil, along with a ſmall proportion of the juice of an onion.

SECTION II.

Of perforating the LOBES *of the* EARS.

BY ſome medical writers of the laſt and preceding centuries, piercing the lobes of the ears is recommended as an operation that may prove uſeful in ſome diſorders, particularly in affections of the head. In thoſe times, a ſmall ſeton was drawn through the opening, with a view to induce a diſcharge of matter, which in ſome caſes might prove uſeful. At preſent this operation is never employed but for the purpoſe of ornament.

This is perhaps the moſt ſimple of all operations; but as it is ſuppoſed to be of ſome importance by thoſe on whom it is practiſed, it is neceſſary to deſcribe it. As heavy ear rings are apt to tear the parts, the opening ſhould be made as high on the lobe as with propriety it can be done; and the ſpot ſhould be previouſly marked with ink. The patient being ſeated, and the head ſecured by an aſſiſtant, the lobe of the ear ſhould be ſtretched upon a piece of cork placed beneath it. The ſurgeon is now to pierce it with the inſtrument, fig. 6. Plate LXIV. and having puſhed it ſo far through that the tubular part of it is freely out on the oppoſite ſide, the cork muſt be withdrawn with the perforator ſtuck into it. A ſmall piece of lead wire is now to be inſerted into the tube remaining in the ear; and on being drawn into the perforation, the lead muſt be left in it. By moving it daily, which may be done with little or no pain, if it be previouſly rubbed with oil, the paſſage will ſoon become callous, and thus the operation is completed.

Before concluding the chapter on the diſeaſes and operations upon the ears, it may be expected that we ſhould deſcribe the method of cauteriſing or burning behind the ears for the tooth ach. At one period this operation was much employed, and different inſtruments were propoſed for doing it. It is unneceſſary, however, to delineate any of them; for the practice is now, we preſume, very generally laid aſide: and at any rate it may be done with a red hot probe of any kind equally well as with the neateſt inſtrument. It was ſuppoſed to prove uſeful by burning or deſtroying the nerve producing the pain: but it would rather appear to act by inducing terror or ſurpriſe; and if this is the caſe, it is probable that the ſame operation would prove effectual if practiſed in any other part. But as the pain attending it would by moſt people be conſidered as more ſevere even than the pulling of a tooth, it is not probable it will ever be revived.

CHAPTER XXXII.

Of the WRY NECK.

THE Neck is ſometimes conſiderably bent to one ſide: When this takes place to ſuch a degree as to be productive of much deformity, the aſſiſtance of ſurgery is in ſome inſtances employed for it.

The Wry Neck may be produced in various ways. It may depend upon an original malconformation of the bones of the neck—upon a preternatural degree of contraction in the muſcles of one ſide of the neck, particularly of the ſternomaſtoideus muſcle—or, it may be induced merely by a contraction of the ſkin, in conſequence of extenſive ſores and burns.

When the vertebræ of the neck are diſtorted, it would be in vain to attempt any means of relief; but either of the other cauſes we have mentioned ſeem to admit of almoſt a certain removal.

In books of ſurgery the operation for the wry neck is very commonly deſcribed; and as this deformity has in general been imagined to proceed ſolely from a contraction of the ſterno maſtoid muſcle, a diviſion of this muſcle is uſually recommended as the only method of cure that can be depended on. Even Mr. Sharpe was of this opinion; and he delineates an inſtrument termed a probe razor for performing it.*

But were we even to admit that the diviſion of this muſcle was a neceſſary meaſure, the method of doing it by introducing the probe razor beneath it and dividing it afterwards, as is recommended, appears to be exceptionable, as being attended with much riſk of wounding the contiguous blood veſſels: it would ſurely

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* Vide Sharpe's Surgery, Chap. XXXV.

ly be better to divide the muſcle by repeated ſtrokes of a ſcalpel, and to continue the inciſion in a gradual manner to ſuch a depth as may be neceſſary; by which even the large veins of the neck would be avoided. But although we allow that a wry neck may be ſometimes produced by a contraction of this muſcle, yet it appears to be a rare occurrence: I have met with different inſtances of this deformity, and in all of them the contraction ſeemed to be in the ſkin alone.

When the ſkin only is affected, the parts are more eaſily ſeparated and with leſs riſk than when any of the deep ſeated muſcles are to be divided: but even this ſhould be ſlowly done, ſo as to avoid the external jugular veins; for although no great detriment might enſue from their being cut, we ſhould run no riſk of wounding them unneceſſarily. But whether the cauſe of contraction be ſeated in the ſterno maſtoid muſcles or in the ſkin, the inciſion ſhould be carried ſo deep as to remove it effectually, otherwiſe little or no advantage will be gained by the operation.

We ought not, however, to conclude, that our object is accompliſhed by the mere diviſion of the contracted parts; for unleſs ſome method be employed to ſupport the head during the cure of the ſore, it will ſtill be apt to incline more to this ſide than to the other, by which the parts newly divided will readily unite, ſo that no advantage will be gained by the operation. By Mr. Sharpe and others we are indeed adviſed to ſtuff the ſore with lint, ſo as to prevent this inconvenience with as much certainty as poſſible; but I know from experience that this does not ſucceed, and that nothing will anſwer but a firm ſupport being given to the head. For this purpoſe the inſtrument repreſented in Plate LXVI. fig. 1. will be found very uſeful: It was made for a caſe of this kind, in which it was uſed for ſeveral weeks, and with complete ſucceſs. It ſhould always be wore not only till the ſore is healed, but for ſome time thereafter; and if properly fitted to the parts upon which it reſts, it is uſed without any uneaſineſs.

The ſkin beneath the chin is ſometimes ſo much contracted in conſequence of burns and other cauſes, as to draw the head conſiderably down upon the breaſt: the ſame method of cure muſt be practiſed for it that we have juſt recommended for the wry neck. The contracted ſkin muſt be freely divided with a ſcalpel, and the head muſt be properly ſupported from behind till the ſore is cicatriſed.

CHAPTER XXXIII.

Of DISEASES *of the* NIPPLES.

THE Nipples are in ſome caſes ſo deeply ſunk in the breaſt, that a child in attempting to ſuck, finds it difficult or even impoſſible to lay hold of them.

To remedy this inconvenience, different means are employed. If the prominent part of the breaſt can be preſſed ſo far back as to uncover even a ſmall part only of the nipple, it may commonly be drawn out by laying a ſtout child of ſix or eight months old to ſuck it: But as this cannot be always done, glaſſes of different kinds are employed for the ſame purpoſe. In Plate LXV. fig. 1. and 3. repreſent two forms of glaſſes with which the breaſt may either be ſucked by the patient herſelf, or by an aſſiſtant; and fig. 2. is a glaſs cup, mounted with a bag of elaſtic gum. In uſing this the air muſt be preſſed entirely out of the bag, when the cup being placed upon the breaſt ſo as to include the nipple, ſuch a degree of ſuction is produced as has a conſiderable effect in drawing it out. The bag, however, ſhould be much larger than it is commonly made; for when of the ordinary ſize, it does not act with ſufficient force. But which ever of theſe means is employed, it ought to be perſiſted in till the nipple is drawn fully out; and this ſhould be always done immediately before the child attempts to ſuck.

The nipples, like every other part of the body, are liable to ulcerations; but from their peculiar delicacy, any ſores with which they are attacked, are always productive of much diſtreſs, while the ſucking of the child tends not only to render them worſe, but of much longer duration than they otherwiſe would be. Cracks or

PLATE LXV.

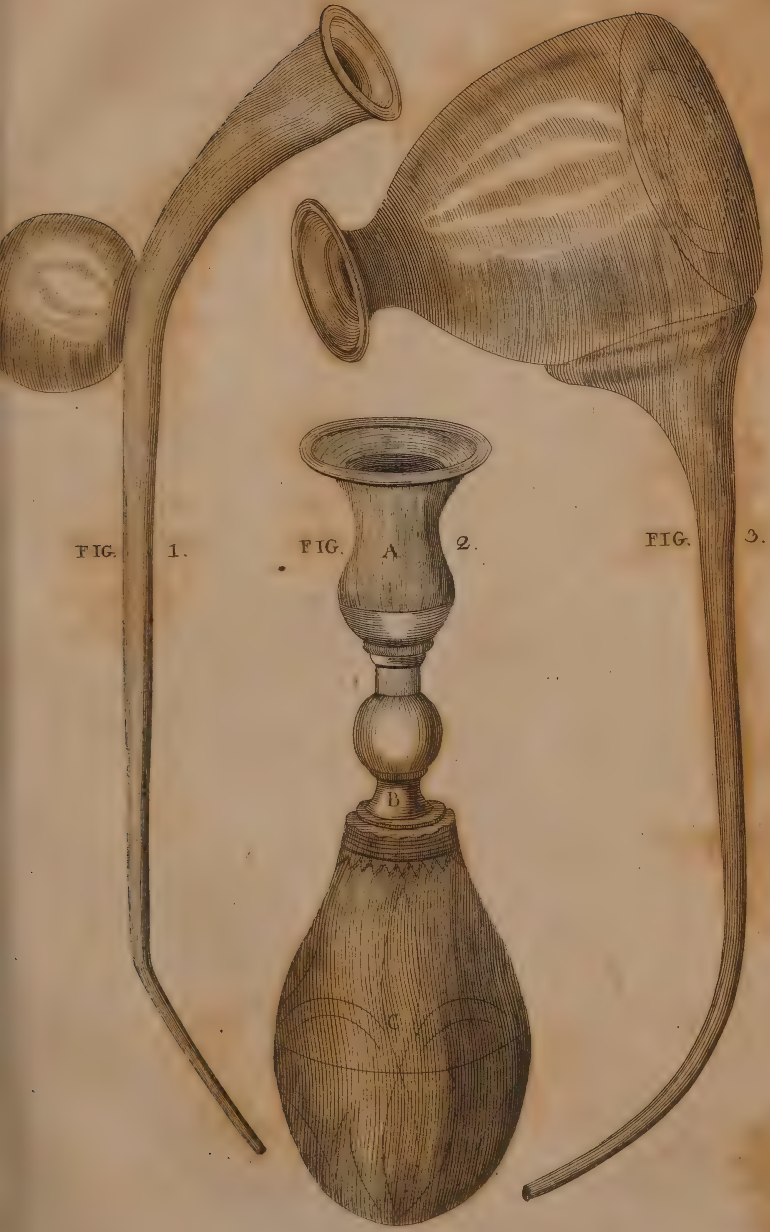
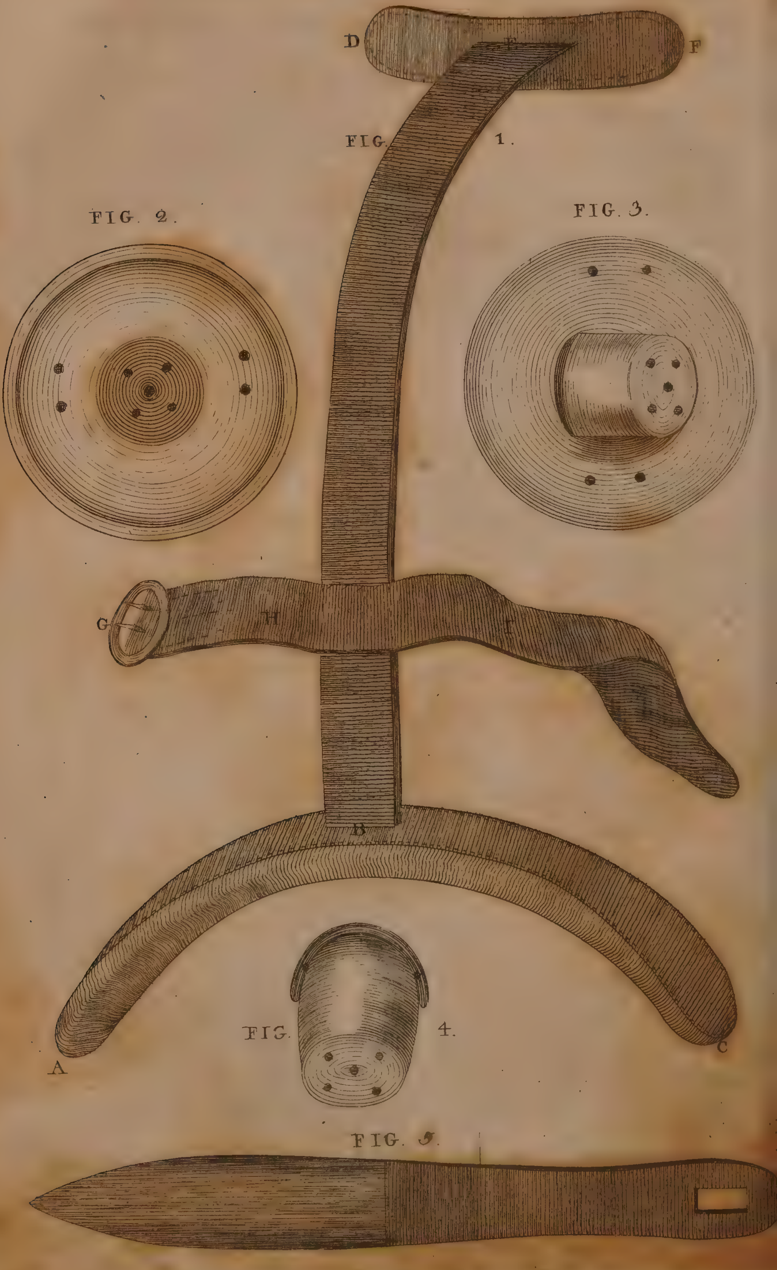


FIG. 1.

FIG. 2.

FIG. 3.

PLATE LXVI.



or chops in the nipples have not a formidable appearance, but they are commonly much more painful than ulcers of the greateſt extent.

Various remedies are employed for theſe affections, but emollients are moſt frequently uſed: I have not found, however, that applications of this kind afford any permanent relief; for although they may give temporary eaſe, this ſeldom if ever proves of long duration. Mild aſtringents and drying applications are more to be depended on. As a waſh, lime water proves often uſeful; and Port wine and water, or brandy ſufficiently diluted, may be employed for the ſame purpoſe. After bathing the parts with one or other of theſe, the nipple ſhould be covered with a bit of ſoft lint ſpread with Unguentum Nutritum or Goulard's cerate; but of theſe the firſt is the beſt: I have often uſed it with advantage, and I know of nothing that anſwers ſo well in chops or cracks wherever they are ſituated. I find too, that it is much employed by my friend Dr. Hamilton, Profeſſor of Midwifery in this Univerſity; whoſe practice being very extenſive, his authority may be relied on. It is proper, however, to obſerve, that the nipple ſhould be entirely cleared of this application always before the child is allowed to ſuck; for as lead forms the baſis of it, miſchief might enſue from much of it being carried into the ſtomach.

Till the nipple is completely healed, the child ſhould not be allowed to ſuck oftener than is altogether neceſſary; and when one of the nipples only is ſore, this may be managed with little difficulty, as the child may be kept at the ſound breaſt while the other may be drawn from time to time with a glaſs, which does not injure the nipple. In Plate LXVI. figures 2. 3. and 4. ſome ſmall cups are repreſented for protecting the nipples during the cure. When properly fitted to the parts, they not only protect them from the friction of the clothes, but allow the milk to run off as quickly as it falls from the breaſt.

CHAPTER XXXIV.

Of ISSUES.

ISSUES are ſmall artificial ulcers which we form in different parts of the body, for the purpoſe of procuring a diſcharge of purulent matter.

As I have elſewhere treated fully of the advantages that may be derived from iſſues, and of the manner in which they ſeem to act in the cure of diſeaſes, it is not at preſent neceſſary to enter minutely upon this part of the ſubject: I ſhall therefore only obſerve in general, that I am daily more and more convinced of the utility of iſſues in the cure of long continued ſores, of whatever kind they may be; and that I am ſtill of the opinion that they act ſolely by diſcharging a certain quantity of the ſerous parts of the blood; and not that they ſerve merely as drains for the noxious humors in the blood, which till of late has been the prevailing idea upon this point.*

Among other errors in practice which this opinion gave riſe to, the choice of ſituation for iſſues was none of the leaſt remarkable. As it was imagined that ulcers as well as other local affections were produced by a determination of morbific humor to a particular ſpot, when iſſues were adviſed, it was conſidered as neceſſary to place them as contiguous to the affected part as poſſible, and always on the ſuperior part of the limb, when the diſeaſe was ſeated on any of the extremities, in order to prevent the morbid matter from falling down to it. But as we now conclude that iſſues prove uſeful or otherwiſe, merely by the quantity of matter which they afford, it appears to be of little importance where they are placed; and accordingly they may be inſerted wherever the patient thinks they will occaſion the leaſt inconvenience.

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* See a Treatiſe on the Theory and Management of Ulcers, Part II. Section I. where this ſubject is more fully conſidered.

There are ſome general rules, however, which ſhould be attended to in the introduction of iſſues: They ſhould never be placed immediately above a bone thinly covered, nor directly above a tendon, nor very contiguous to a large blood veſſel or nerve, nor upon the belly of a muſcle. The beſt ſituation for iſſues is that ſpace which lies between the tendons on the back part of the neck, where there is a conſiderable depth of cellular ſubſtance; the middle of the humerus, near to the inſertion of the deltoid muſcle; and a conſiderable hollow above the flexor tendon on the inſide of each knee. They may likewiſe be inſerted between two of the ribs, and on each ſide of the vertebræ of the back; or in ſhort wherever there is a ſufficient quantity of cellular ſubſtance for the protection of the parts beneath. It is proper, however, to remark, that the ſpot uſually fixed upon for iſſues is perhaps the moſt improper of any, I mean directly below the knee; where there is never much cellular ſubſtance; where the veins of the leg can ſcarcely be avoided; and where they are apt to hurt the contiguous tendons.

There are various ways of forming iſſues: By corroding or removing the ſkin with epiſpaſtic applications; by making an inciſion with a ſcalpel or lancet; by the application of cauſtic; and by the introduction of a cord.

When an iſſue is to be opened by removing a portion of ſkin, a bliſter muſt be applied upon the ſpot exactly of the ſize of the intended ſore; and on the bliſter being removed, a diſcharge of matter may be kept up, by dreſſing the part daily with any of the common ointments in which there is mixed a ſmall proportion of cantharides in fine powder: Or, it ſometimes proves ſufficient to uſe an irritating application of this kind, and a mild ointment of wax and oil alternately.

In forming an iſſue by an inciſion, or with cauſtic, an opening muſt be made of ſuch a ſize as appears to be ſufficient for affording a proper quantity of matter; and the opening muſt be preſerved by inſerting daily into it ſome extraneous body covered with any mild digeſtive ointment, ſuch as baſilicon or linimentum Arcæi, while the whole muſt be ſecured with a proper bandage. Peas are commonly employed for this purpoſe. Kidney beans anſwer very well; and ſome make uſe of gentian root, and of aurantia Curaſlaventia, uſually termed Orange Peas, turned into a proper form. When the opening is made by an inciſion, the ſkin ſhould be ſupported on one ſide by an aſſiſtant, and on the other by the left hand of the ſurgeon; who ſhould now with a ſcalpel in the other make a cut of a ſufficient length and depth for receiving the number of peas intended to be put into it, and thus the operation is finiſhed: But when it is to be done with cauſtic, more attention is requiſite. The common lapis infernalis of different Diſpenſatories anſwers beſt: many compoſitions of cauſtic paſte have been recommended; but I have met with none that for this purpoſe anſwers ſo well. It ſhould be firſt reduced to powder, and made into a paſte with a little water, or with ſoft ſoap, when as much of it ſhould be applied upon the ſpot where the iſſue is wanted as will make an opening of a proper ſize; but as it is apt to ſpread to the contiguous parts, ſome care is required to prevent it. For this purpoſe a piece of leather ſpread with Burgundy pitch, or any adheſive plaſter, with a ſmall hole cut in the centre of it, ſhould be placed upon the part with the opening directly above where the cauſtic is meant to be applied. The ſmall ſpot which is thus left uncovered, muſt now be ſpread with ſome of the cauſtic paſte; and over the whole there ſhould be laid another piece of leather, ſpread with the ſame kind of adheſive plaſter, ſo that there may be no chance of any part of the cauſtic eſcaping. In the courſe of ten or twelve hours, the whole may be removed; for before this, if the cauſtic is good, it will have produced an eſchar of a ſufficient depth. In the ſpace of three or four days, the eſchar will ſeparate from the contiguous ſound parts, when the opening formed by it muſt be filled with peas or ſome other of the ſubſtances we have mentioned.

When it is an object to diſcharge a large quantity of matter by an iſſue, and eſpecially when we wiſh to have it from deep ſeated parts, we do it by the introduction of a cord of cotton or ſilk, forming what is commonly termed a Seton. This remedy is often uſed with advantage in deep ſeated pains, particularly in pains of the breaſt and ſides in caſes of phthiſis pulmonalis. In ſuch caſes it is commonly inſerted between two of the ribs; and it anſwers better in the direction of the ribs than when placed acroſs them, as is ſometimes done. A cord is a frequent remedy too in affections of the head, particularly in ophthalmia and other diſeaſes of the eyes; and in ſuch caſes it is uſually placed in the back of the neck.

When we mean to introduce a cord, the parts at which it is to enter and paſs out ſhould be previouſly marked with ink; and the cotton or ſilk being put into the eye of the flat needle, Plate LXVI. fig. 5. and the parts being ſupported by an aſſiſtant, the needle ſhould now be puſhed in at one of the ſpots and carried out at the other, along with two or three inches of the cord, which ſhould be left hanging out. The irritation which the cord excites ſoon produces a plentiful diſcharge of matter, which may be increaſed or diminiſhed at pleaſure by covering the cord daily, before it is drawn, with a mild or an irritating ointment.

In former times, it was a frequent practice to form iſſues by burning the parts in which they were to be introduced with the actual cautery; and in ſome parts of Europe it is ſtill continued: But as it is much more terrifying than any of thoſe we have mentioned, and as it does not appear to be attended with any particular advantage, it is now in general laid aſide.

In China, Japan, and ſome other eaſtern countries, it is a prevailing practice, in deep ſeated pains, to burn the parts affected down to the bone with moxa. Moxa is a light, ſoft down, of a particular plant. A ſmall cone of it being wrapped up, the baſe of the cone is fixed upon the part with a little glue or mucilage; and fire being put to the oppoſite end of it, it is allowed to remain till the whole is conſumed; and if one application does not prove ſufficient, it is repeated once and again as long as it is neceſſary. The operation may be done equally well with fine flax; but although it has been ſometimes done in different parts of Europe, it is not probable that it will ever be generally practiſed. I have known it, however, remove the moſt obſtinate ſciatic pains, where every other remedy had failed.

CHAPTER XXXV.

Of the Inoculation of the SMALL POX.

THERE is ground to imagine, that almoſt all eruptive diſeaſes, as well as ſome others, may be communicated by inoculation: the practice, however, is confined to ſuch as are not apt to return; for no advantage would ariſe from inducing diſeaſes to which the ſyſtem might afterwards be liable. The plague has been communicated by inoculation; but in this country the ſmall pox is the only diſeaſe we are accuſtomed to inoculate. Some trials have indeed been made for inoculating the meaſles; but as yet they have not ſucceeded.

From the reſult of ſome experiments, there is reaſon to think, that no diſeaſe can be communicated by inoculating with the blood of an infected perſon. This point, however, is not as yet preciſely determined; ſo that farther trials will be neceſſary to aſcertain it. In inoculating the ſmall pox, we employ the matter contained in the puſtules which appear on the ſurface of the body.

The proper period for inoculating—the preparation of the patient—and the ſubſequent treatment of the diſeaſe, are points which more particularly fall to the conſideration of the phyſician. The mode of communicating the infection is our object at preſent.

In the more early practice of inoculation, it was cuſtomary to tie an infected thread round the arm or leg; to rub a little variolous matter upon any part of the body; or to inſert a piece of thread ſoaked in matter beneath the cuticle, with a ſmall needle, and to allow it to remain till there was reaſon to think the infection had taken place. In any of theſe ways the ſmall pox may be readily communicated: but as by ſome of theſe means there is reaſon to ſuſpect that a variolous atmoſphere may be produced, and that the diſeaſe may be thus induced in the ſame way as in the caſe of a common contagion, and conſequently that ſome of the advantages of inoculation may not be obtained, theſe modes of giving the ſmall pox have therefore been long laid aſide.

Till of late inoculation was commonly performed by making an inciſion of about half an inch in length through the ſkin to the depth of the cellular ſubſtance: a bit of thread impregnated with variolous matter was then inſerted, and retained for two or three days by means of a compreſs and bandage. To this practice however, the great unneceſſary pain attending it, and the aptneſs of the wound to degenerate into a diſagreeable ulcer, are ſtrong objections.

The preſent mode of inſerting the matter appears to be in every reſpect more eligible. The point of a lancet, previouſly covered with variolous matter, is inſinuated through the cuticle, ſo as to ſcratch or ſlightly injure the cutis vera. It might frequently indeed be ſufficient to paſs it through the cuticle only; but ſucceſs is more certain when a ſmall particle of blood follows the lancet. When the matter is recently taken in an early period of the diſeaſe, the lancet may be introduced without being moiſtened: But whenever the matter has become firm and hard, it ſhould be rendered perfectly ſoft with a drop of warm water, or by holding it in warm ſteam.

The operation may be done in any part of the body; but the arm is generally preferred. One ſcratch would for the moſt part prove ſufficient; but with a view to enſure ſucceſs, it is right to make two or even three at the diſtance of an inch from each other. It is to be obſerved, however, that when the matter takes effect in all the ſcratches, the inflammation which enſues being communicated from one to the other, is often conſiderable, and gives much pain and uneaſineſs. This might be prevented by making the ſcratches at a ſtill greater diſtance, or even in diſtinct parts of the body. One being made upon each leg or thigh would obviate every inconvenience of this kind.

In this method of inoculating we never employ either bandage or compreſs; for the wound is ſo trifling that no kind of dreſſing is neceſſary: ſo that we readily ſee, at the end of the ſecond or third day, whether or not the infection will take place; for in general, by this time when the operation is to ſucceed, the ſcratches made with the lancet become red, ſwelled, and ſomewhat painful.

CHAPTER XXXVI.

Of WOUNDS.

SECTION I.

Of Wounds in general.

VARIOUS definitions have been given of the term wound; but few if any of them appear to be exact. Boerhaave defines a wound to be, a recent bloody ſolution of continuity in any ſoft part, by the motion, preſſure, or reſiſtance of ſome hard or ſharp body. By Sauvages, it is ſaid to be a mechanical diviſion of any fleſhy part, attended with a ſeparation of the parts newly divided, together with a diſcharge of blood and a tendency to inflame and ſuppurate. And Ludwig defines a wound to be a morbid diviſion of parts which in a ſtate of health ought to be united.

Theſe are the definitions of this term which have been moſt generally adopted; but it is evident that none of them are ſufficiently correct. A part may be deeply cut, even large blood veſſels may be divided, without any diſcharge of blood taking place, as frequently happens in lacerated wounds, and in ſuch as are attended with much contuſion: and where the ſmaller veſſels only are divided, the diſcharge of blood ceaſes, almoſt in every inſtance, in the courſe of a few hours from the time that the wound was inflicted.

The definition recited above from Mr. Sauvages, is too extenſive: It comprehends a period or ſtage of wound which does not always exiſt, viz. a tendency to ſuppurate. We know that wounds frequently terminate in gangrene and death, without any previous ſuppuration; while in other inſtances they heal by the firſt intention, and their edges adhere to one another without any appearance of pus.

Neither is Dr. Ludwig's definition of a wound correct: Parts which ought to be united, may be divided without being wounded. Thus a blood veſſel, nerve, tendon, or muſcle, may be completely ruptured either by a violent ſprain or a contuſion; but unleſs the correſponding ſkin and other teguments are divided, we do not ſay that ſuch parts are wounded. Nor are theſe affections confined to the ſmaller muſcles and tendons; for inſtances often occur of the different parts even of the largeſt muſcles being thus violently ſeparated from one another.

Every recent ſolution of continuity in the ſofter parts of the body, when attended with a correſponding diviſion of the teguments, may be denominated a wound.

From this definition of wounds, it is evident that they will exhibit great variety in their nature and appearances. This will ariſe from different cauſes; but more particularly from the nature of the injured parts; from the manner in which they have been produced; and from their extent.

Thus wounds in fleſhy muſcular parts are very different, both in their nature and appearances, from ſuch as affect membranous or tendinous parts only. Wounds that are made with a ſharp cutting inſtrument are materially different from ſuch as are attended with much contuſion or laceration: and punctured wounds exhibit very different appearances, and for the moſt part are productive of very different effects, from ſuch as are more free and extenſive. In the ſubſequent parts of this ſection theſe varieties in wounds will be conſidered. In the mean time, we ſhall give a deſcription of the phenomena which uſually take place in the moſt frequent form of this affection, what may be termed a Simple Inciſed Wound; by which both the theory and practice which we mean to inculcate will be rendered more intelligible.

On the inſtrument being withdrawn with which a wound of this kind has been made, the firſt appearance we take notice of is a ſeparation to a certain extent of the divided parts; and this always in a greater or leſſer degree, according to the depth and length of the wound, and according as the fibres of the injured part are divided more or leſs tranſverſely. Thus a wound, even of a conſiderable length, if it runs in the ſame direction with the fibres of a muſcle, will be attended with a ſmall retraction of the ſkin; while a large vacuity will take place in a wound of leſs extent where a ſtrong muſcular part is cut directly acroſs. Nay, in this laſt caſe, the ſeparation of the divided parts is in ſome caſes ſo conſiderable, as to give cauſe to ſuſpect that a portion of them has been removed; while in the other it is often ſo trifling, that even an extenſive wound will have the appearance of a ſtraight line only: a circumſtance by which practitioners have been often led to conſider as of no great importance, wounds which in their conſequences have proved to be formidable; and by which the propriety of examining every wound with attention is ſtrongly pointed out.

The next appearance which takes place in wounds, is a diſcharge of blood to a greater or leſſer extent, according to the ſize of the cut, and to the number and ſize of the veſſels that are divided; at leaſt this is the caſe in wounds made with a ſharp cutting edge. Where the parts have been much bruiſed or lacerated, we have already remarked, that even large blood veſſels may be divided without any hemorrhagy enſuing.

For the moſt part, this evacuation of blood from wounds proves ſo alarming, that means are employed to ſtop it; but when this is either neglected or not conſidered as neceſſary, if the injured veſſels are not large, the irritation produced by the wound itſelf, as well as by the free application of the external air to their divided extremities, excites ſuch a degree of contraction in them, that in this way alone the hemorrhagy is ſoon checked. The diſcharge of red blood becomes gradually leſs: It then ceaſes entirely, and is ſucceeded by an oozing of a ſerous fluid, which in the courſe of a few hours likewiſe ſtops, when the whole ſurface of the ſore is found either ſomewhat dry or even parched like; or it is covered over with a cake of coagulated blood.

In this way nature ſeems to operate in putting a ſtop to hemorrhagies which ariſe from wounds. Another idea is commonly entertained indeed of this ſalutary proceſs: It is ſuppoſed that ſmall coagula of blood plug up the orifices of the veſſels, and remaining in them preſerve them of the ſame ſize of which they were before being divided.

This, however, is by no means the caſe, as will at once appear to any who will take the trouble of diſſecting the ſtump of a patient dying after an amputation. Inſtead of the mouths of the divided arteries being plugged up with blood, he will find them perfectly empty and contracted for a conſiderable ſpace from their extremities; nay, in moſt inſtances, he will obſerve that they become firm ſolid cords, ſo as never afterwards to be capable of receiving a ſupply of blood. Nor is this proceſs of nature difficult to explain. It is arterial hemorrhagies we are now conſidering; for wounded veins, if they be not compreſſed between the injured part and the heart, ſeldom diſcharge ſo much blood as to prove alarming. Now, as the arteries are poſſeſſed of a ſtrong contractile power; they will readily exert this power on the irritating cauſes mentioned above as attendants on wounds, being applied to them. In this manner the blood is prevented from flowing in its uſual channel; but nature does not fail to provide a different route for it, by forcing it through the moſt contiguous anaſtomoſing arteries, which ſoon become ſo much enlarged, as to allow it to paſs with freedom;

while, in the mean time, the contracted ſtate of the wounded extremities of the arteries terminates in a firm adheſion of their ſides, in conſequence of that inflammation which in ſome degree ſucceeds to every wound.

When a wound is made with a clean cutting inſtrument, the pain attending it at firſt is in general inconſiderable, unleſs a nerve or a tendon has been partially divided; in which caſe it proves commonly ſevere. But in every caſe the wounded parts become painful in the courſe of a few hours from the time of the injury being inflicted. They become red, tenſe, and even conſiderably ſwelled: And where the wound is extenſive, an increaſed degree of heat takes place, together with thirſt, quickneſs of pulſe, and other ſymptoms of fever.

In ſome inſtances theſe ſymptoms continue to increaſe, and to prove more and more ſevere, till at laſt they terminate in mortification; but for the moſt part they are carried off in a more favourable manner. The ſurface of the wound, which for ſome time remained perfectly dry, is gradually rendered moiſt and ſoft by a thin ſerum oozing into it; which being allowed to collect, is at laſt, by the heat of the affected parts, and in ſome caſes by the application of artificial heat, converted into purulent matter: and in general, the preceding ſymptoms of pain, tenſion, and fever, abate more or leſs quickly, according as this formation of matter is more or leſs plentiful. From the time that ſerum begins firſt to ooze into the cavity of a wound, the tenſion and pain begin to abate, and they vaniſh entirely on a free ſuppuration taking place; by which the moſt natural balſam is produced that can be applied to wounds.

From this hiſtory of the progreſs of a wound, it is evident that all the ſymptoms we have enumerated, are ſuch as originate from inflammation. Indeed, they are exactly ſuch as accompany a common phlegmon. The pain, redneſs, and tenſion, which always accompany wounds to a certain degree, are the leading ſymptoms in every caſe of phlegmon; and the ſerous effuſion into the cavities of wounds, with the ſuppuration which enſues, are circumſtances exactly ſimilar to thoſe which occur in every caſe of abſceſs. I therefore conſider a wound as an exciting cauſe of inflammation; and ſome advantage, I think, may be derived in practice, from conſidering it chiefly in this point of view. This, however, will more clearly appear when we come to ſpeak of the method of cure; when it will be rendered obvious, that in the treatment of wounds, thoſe means prove uniformly moſt effectual which are moſt powerful in preventing any violent degree of inflammation.

The deſcription I have given of wounds relates to the moſt ſimple and leaſt hazardous kinds of them; where the injury has been done, as was already remarked, with a ſharp cutting inſtrument, and where the parts have been laid freely open. In ſuch circumſtances, when no organ of much importance to life has been divided, and when the cut is ſeated in a fleſhy muſcular part, if nature be not impeded in her operation, the whole ſurface of the ſore becomes covered with ſmall ſprouts or granulations almoſt immediately on a free ſuppuration taking place; and theſe continuing to advance, a cure is at laſt accompliſhed in the manner already deſcribed in a former part of this work.*

This happy termination of a wound, however, may be prevented by various cauſes. Indeed, it requires the concurrence of many circumſtances. Theſe we ſhall afterwards have occaſion to treat of in a particular manner. At preſent I ſhall enumerate thoſe only which ariſe from the nature of the wound.

In a free inciſed wound, the inflammation which takes place is not in general greater than is neceſſary to produce that degree of ſuppuration which we have ſhown to be requiſite; and in wounds of this deſcription, matter is never allowed to lodge, as it is commonly diſcharged almoſt as ſoon as it is formed. Theſe are points of the utmoſt moment in the management of wounds. Indeed, it is known to every practitioner that a cure can never be expected if a due degree of inflammation does not take place, and if a free outlet be not given to the matter that may form. Every circumſtance therefore in the nature of a wound, which tends either to excite an undue degree of inflammation, or to produce a lodgement of matter, muſt be conſidered as unfavourable: And hence punctured wounds, and thoſe that are attended with contuſion or laceration, are particularly hazardous.

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* Vide Treatiſe on the Theory and Management of Ulcers, &c. Part II. Section II. § 2.

Punctured wounds prove often more dangerous than wounds of greater outward extent, from large blood veſſels and other deep ſeated parts being hurt: and they are commonly more painful, being frequently attended with a partial diviſion of contiguous nerves or tendons; a circumſtance productive of more violent pain than what uſually enſues from a free diviſion of them. But the greateſt riſk in a punctured wound ariſes from the lodgement of matter; a circumſtance which takes place more readily in this than in any other variety of wound; and to obviate which, the niceſt attention on the part of practitioners is often requiſite.

In contuſed and lacerated wounds, if the violence with which they have been inflicted has not been conſiderable, the parts will frequently recover their tone; the attending inflammation will not run to any great length; and a free ſuppuration being induced, a cure will at laſt be accompliſhed in a manner ſimilar to what we have deſcribed in caſes of ſimple inciſed wounds. But it often happens that the contiguous parts are ſo much injured as to give no cauſe to expect ſuch a favourable event. Where a violent degree of contuſion has been applied, the texture of the parts affected is ſometimes ſo completely deſtroyed, that the circulation

tion is ſtopped, and mortification enſues; and where this proceeds to any conſiderable extent, the danger attending it is always great. Again, in wounds attended with much laceration, mortification is apt to occur from a different cauſe. The pain and irritation attending them proceed ſometimes to ſuch a height, as to induce a great degree of inflammation; which, notwithſtanding the means uſually employed to prevent it, very frequently terminates in the manner we have mentioned. Indeed, ſo far as my obſervation goes, inflammation induced by this cauſe is more apt to terminate in gangrene than any other inflammatory affection proceeding from external violence.

In forming a prognoſis of wounds, the circumſtances we have juſt been conſidering merit our particular attention: but there are others which ſhould likewiſe be kept in view; and theſe more eſpecially are, the age and habit of body of the patient; the texture of the wounded part; the part of the body in which the injury is inflicted; and the riſk of ſuch parts of importance as lie contiguous, being ultimately made to ſuffer, although not immediately injured.

Thus, it is obvious, that in a ſound healthy conſtitution, wounds will, cæteris paribus, be leſs hazardous than thoſe that are inflicted on people of diſeaſed habits of body; for we commonly obſerve, where the conſtitution is tainted with any diſeaſe, that even the ſlighteſt wounds are apt to become troubleſome, and to degenerate into ſores which will not heal till the diſeaſe of the ſyſtem be removed: And we alſo obſerve, that the healing of ſores depends in ſome meaſure upon the age of the patient; that is, a cure is for the moſt part more quickly accompliſhed in youth and in middle age, than in very advanced periods of life.

There are many exceptions, however, to this; for whenever the natural firmneſs and elaſticity of the muſcular fibres are not much impaired, we do not find that old age proves unfavourable to wounds. When the conſtitution is poſſeſſed of ſuch a degree of firmneſs and irritability, that any wound which takes place will be productive of a neceſſary degree of inflammation; old age ought by no means to be conſidered as a diſadvantage. On the contrary, in ſuch circumſtances it proves always ſalutary, by tending to render the ſymptoms more moderate than they are apt to be in more early periods of life. This is particularly the caſe in extenſive wounds of every kind: and we obſerve it in a remarkable manner in chirurgical operations; eſpecially in lithotomy, and in the amputation of any of the extremities; which have commonly, in the courſe of my experience, proved more ſucceſsful in healthy old people than at any other period of life, and evidently from the cauſe we have endeavoured to point out.

With reſpect to the texture of a wounded part, it is well known that wounds heal not only more quickly but more kindly in ſome parts than in others. Thus wounds of the cellular ſubſtance heal more eaſily than ſuch as paſs through any of the muſcles; while thoſe that are confined to the fleſhy parts of muſcles prove much leſs formidable than wounds of tendinous or ligamentous parts; for, beſides occaſioning leſs pain and inflammation, they are not ſo apt to be productive of any permanent diſadvantage. The deepeſt cuts may be inflicted on the belly of a large muſcle, with little or no riſk of any inconveniency being experienced from them in future; but the contiguous joints are very apt to remain ſtiff and unmanageable, when the tendons which paſs over them are much injured.

When wounds penetrate to a ſtill greater depth, ſo as to do any material injury to bones, they prove always more tedious and uncertain than when ſoft parts only are divided: for in ſuch caſes a wound will ſeldom or never heal till ſome portion of the bone exfoliates; a proceſs which very commonly requires a conſiderable length of time to be accompliſhed.*

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* Vide Treatiſe on Ulcers, &c. Part II. Section VII.

Wounds in glandular parts are more to be dreaded than the mildneſs of the ſymptoms which appear at firſt would lead us to imagine. When ſmall glands only are divided, they often heal readily; but when any of the larger glands are injured, the ſyſtem is not only apt to ſuffer from the ſecretion for which they are intended being impeded, but the ſores which enſue very commonly become fungous, and are cicatriſed with difficulty.

When any of the larger lymphatic veſſels are wounded, the cure often proves tedious by a conſtant diſcharge of a thin limpid fluid, by which the formation of a cicatrix is prevented: And when at laſt a cure is obtained, very troubleſome ſwellings are apt to occur in the under part of the limb, owing to the obſtruction of the lymph in its paſſage to the heart by the newly formed cicatrix. Of this every practitioner of experience muſt have ſeen ſome inſtances. I have met with ſeveral; particularly after the extirpation of ſchirrhous glands when deeply ſeated in the arm-pit. In ſuch caſes the large lymphatics of the arm are very frequently cut, and very obſtinate œdematous ſwellings of the whole member are apt to enſue.

When a large nerve is completely divided, the pain attending it will be inconſiderable; but the parts beneath will be deprived both of their ſenſibility and power of motion, unleſs they are ſupplied with ſome other branches. But when a nerve is only punctured, the pain which takes place is commonly ſevere: and this is apt to be followed with a high degree of inflammation; ſmart fever; ſubſultus tendinum; convulſions; and even death. Theſe violent appearances, however, do not often occur in northern climates; but they frequently happen in warm countries, where they are apt to terminate in a ſymptom which often proves fatal, the locked jaw.

In wounds of any of the larger blood veſſels, our firſt object is to diſcover, whether the hemorrhagy which enſues proceeds from arteries or veins; for in general no material inconvenience is experienced from wounds even of the largeſt veins, while the utmoſt danger is to be dreaded from wounds of the larger arteries. If the artery be ſo ſituated that a ligature cannot be put round it, the loſs of blood will probably ſoon prove fatal: and even where the diſcharge of blood can be ſtopped with eaſe, if the limb has no other artery to ſupply it, a mortification is to be dreaded. It often happens, indeed, even that large arteries are ſecured by ligatures without any detriment to the parts beneath: But in this caſe there are other arteries or anaſtomoſing branches of ſuch a ſize as to give paſſage to a ſufficient quantity of blood.

The ſite of a wound is alſo an object of importance. Thus wounds in the extremities, when confined to parts lying above any of the hard bones, are not to be conſidered as ſo hazardous as thoſe which paſs into any of the joints: and in other parts of the body, wounds which penetrate any of the larger cavities, prove always more dangerous than thoſe which do not run to ſuch a depth.

This will proceed from different cauſes. The danger will be increaſed by the chance of ſome organ of importance being directly injured: By air, and in ſome caſes by extraneous bodies, finding acceſs to cavities which nature never meant to be expoſed: And laſtly, by the lodgement of matter; a circumſtance which is with much difficulty avoided in all wounds which penetrate to ſuch a depth.

We have likewiſe to conſider, that although no organ of importance may be directly wounded in ſuch a manner as to produce immediate death; yet that much danger may ariſe from a variety of circumſtances; and wounds may eventually prove mortal which at firſt were not attended with any evident riſk.

Thus wounds in the lungs, and other viſcera, prove ſometimes fatal, from continuing to diſcharge ſuch quantities of blood for a conſiderable time as at laſt deſtroy the patient; although at firſt the diſcharge might not appear to be of much importance. The ſtomach, and different parts of the alimentary canal, may be injured in ſuch a manner as to terminate in death without exhibiting any immediate appearance of danger. The external coat of the aorta has been removed by the point of a ſmall ſword; and the wound has been nearly healed when the patient died ſuddenly from a rupture of the artery: And wounds of the gall bladder, or of its excretory duct; of the receptaculum chyli; of the thoracic duct, and ſome other viſcera; may for ſeveral days afford no ſuſpicion of danger, and yet terminate fatally at laſt.

Wounds ſometimes prove fatal from inflammation ſpreading to contiguous viſcera which were not at firſt injured; and wounds, which have at firſt appeared to be of little or no importance, have at laſt terminated in the worſt manner, merely by miſmanagement; either in the application of dreſſings or bandages; or in the conduct of the patient with reſpect to food, drink, and exerciſe: for it is well known, that much miſchief has been done by improper dreſſings, and eſpecially by too light bandages: and we likewiſe know, that miſconduct with reſpect to food is daily the cauſe of wounds going wrong, which otherwiſe would probably have done well.

It thus appears, that a variety of circumſtances fall to be conſidered, to enable us to judge of the probable termination of wounds. In doing this with accuracy, practitioners of experience have frequent opportunities of ſhowing their ſuperiority. This ſubject ought therefore to be conſidered as highly important by all who wiſh to diſtinguiſh themſelves. A minute knowledge of anatomy, a cool temper, and a ſteady hand, will enable any practitioner, even with no great experience, to perform many of our moſt important operations ſufficiently well: And accordingly, in different hoſpitals, we daily meet with good operators; but we do not often find ſurgeons poſſeſſed of that knowledge in the prognoſis of chirurgical diſeaſes which might be expected; that attention being ſeldom beſtowed which is neceſſary to attain it.

SECTION II.

Of the Cure of Simple Inciſed Wounds.

IN the management of wounds of every kind, the firſt object requiring our attention is the hemorrhagy; more eſpecially when it is profuſe. The ſafety of the patient requires it: The alarm which it gives, not only to byſtanders, but to the practitioner himſelf, renders it neceſſary. Nor can the real ſtate of a wound be diſcovered with accuracy till the diſcharge of blood be checked.

Hemorrhagies are moſt immediately ſtopped by preſſure applied to that part of the divided artery which is next to the heart: This preſſure is made by the tourniquet, when the wound is in any of the extremities;* and by the hands of aſſiſtants, in wounds of the trunk of the body or of the head.

In this manner, if the preſſure be properly applied, almoſt any hemorrhagy may be ſtopped till the wounded veſſels can be ſecured with ligatures; which we have elſewhere ſhown to be the ſafeſt as it is the eaſieſt method of preventing patients with ſuch injuries from ſuffering.* Much indeed has been ſaid, even of late years, of the inconveniences which ligatures are ſuppoſed to induce: but this has proceeded either from the intereſted views of ſome individuals who may have wiſhed to eſtabliſh the reputation of different ſtyptic applications; or from the groundleſs fears of young practitioners. Where the contiguous nerves, or even where much of the ſurrounding muſcular parts, are included in ligatures, ſevere pain, and other troubleſome ſymptoms, will no doubt be induced; but this is not the fault of the remedy, but of the method of uſing it. Indeed this is ſo obviouſly the caſe, that reaſoning in the farther ſupport of it does not ſeem to be neceſſary; for every practitioner of experience will admit that a proper application of the ligature is ſeldom if ever productive of any material inconvenience, and that we can depend on it with more certainty than on any other remedy for putting a ſtop to hemorrhagies from wounded arteries.

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* Vide Vol. I. Chapter II.

When treating of the method of applying ligatures to arteries, in the firſt volume of this work, I gave it clearly as my opinion, that it may be beſt done by the tenaculum, an inſtrument repreſented in Plate I. fig. 1. And after much additional experience of its utility, I now think it right to ſay, that I am more and more convinced of its being much ſuperior to the needle; which cannot be uſed without a portion of the contiguous ſoft parts being included in the ligature; a circumſtance which in every inſtance we ſhould endeavour to avoid. Many imagine that the tenaculum may be uſed with ſafety in the application of ligatures to arteries of a middling ſize, while they are afraid of cutting thoſe of a ſmall ſize aſunder, if ſome of the contiguous cellular ſubſtance be not included along with them: and in tying the large trunks of arteries, they ſuſpect that the ligatures would be apt to be forced off by the ſtrong pulſations of theſe veſſels, if they were not ſupported by being firmly fixed in the contiguous parts. I have not, however, had a ſingle inſtance of obſerving that either of theſe objections to this practice is well founded. For a number of years paſt, I have laid aſide the needle, for the purpoſe of applying ligatures to arteries, almoſt entirely; and in the courſe of that time, I have employed the tenaculum indiſcriminately in hemorrhagies from arteries of all ſizes.

Wounded arteries are ſeldom ſo ſituated as to prevent the hemorrhagy from being ſtopped in the manner we have mentioned: for when they lie at the bottom of deep wounds, with narrow contracted mouths, the wound may commonly be enlarged ſo as to admit of their being tied with ligatures; and for the moſt part it may be done with ſafety. Where the enlargement of a wound is not clearly neceſſary, no perſon of experience would adviſe it; but the practice is always ſafe and proper in hemorrhagies proceeding from arteries lying ſo deep that ligatures cannot otherwiſe be applied to them. As this practice, however, has been very inadvertently condemned by ſome practitioners in a general way, from their ſuppoſing it to be rarely if ever neceſſary; a timidity has been thereby introduced, which in various inſtances has been the cauſe of miſchief: Patients have been tormented with the application of tight bandages, and with the trial of different ſtyptics which ſeldom if ever ſucceed, when the hemorrhagy might have been ſtopped in the moſt effectual manner by a ſmall enlargement of the wound: Nay, many limbs have been amputated from the ſame cauſe, which might eaſily have been ſaved; particularly in caſes of compound fracture, where a hemorrhagy, proceeding from a deep ſeated artery which cannot be eaſily tied, is too frequently conſidered as a ſufficient reaſon for removing the limb. From particular circumſtances, in a few caſes of compound fracture, it may happen that hemorrhagies cannot be ſtopped without laying the injured parts ſo extenſively open, as might induce more hazard than amputation itſelf. This, however, is a very rare occurrence; and it will ſeldom take place where the caſe has been properly treated from the beginning.

When the injured artery runs in the ſubſtance of a bone, no ligature, it is evident, can be applied to it; and, therefore, in ſuch a caſe, enlarging the wound could not be attended with much advantage. But arteries in this ſituation are never ſo large as to lead us to be much afraid of any hemorrhagies that may proceed from them; nor does it often happen that they continue to bleed long after they have been completely divided. An artery thus ſituated, being merely wounded, may diſcharge a great deal of blood; but I have met with different inſtances of the hemorrhagy ſtopping almoſt immediately on the veſſel being cut acroſs. Authors indeed have have ſaid, that the utmoſt danger has been induced by arteries ſurrounded with bone being wounded; nay, that death itſelf has happened from this cauſe, owing to the impoſſibility of including them in ligatures. I am convinced, however, that it is a partial diviſion only of ſuch arteries that will ever produce hemorrhagies of any importance; for they are always ſmall, and they never adhere ſo firmly to the ſurrounding bone as to be prevented from contracting on being freely divided.

Where the diſcharge of blood proceeds from large veſſels, the means we have mentioned are the moſt effectual for putting a ſtop to it. But when it occurs from an infinite number of ſmall arteries over the whole ſurface of the wound, other remedies muſt be employed. We muſt refer, however, to a former chapter of this work, where this ſubject was more fully conſidered.*

The hemorrhagy being ſtopped, the next object requiring our attention is the removal of any extraneous body that may have been admitted: and where ſuch ſubſtances are not deeply ſeated, this is always done both with moſt eaſe and ſafety with the fingers alone; for when forceps and other inſtruments are employed, we can ſcarcely fail to injure the contiguous parts.

The examination of wounds, with a view to diſcover extraneous bodies, ought to be made with much caution and delicacy; for, handling the parts roughly, gives unneceſſary pain, and is apt to induce a degree of inflammation, which often proves hazardous.

But although it is always proper to accompliſh the removal of extraneous bodies with as little pain to the patient as poſſible; yet wherever we have any certainty of bodies of this kind being lodged, we ought by all means to proceed with firmneſs, in the firſt place, in diſcovering their ſituation, and afterwards in removing them, excepting in a few particular caſes where this cannot be done without much riſk of injuring parts of real importance to life. In ſuch caſes the judgment of the practitioner muſt decide between the danger that may probably enſue from the extraneous body being allowed to remain, and that which may ariſe from his proceeding to remove it immediately.

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* Vide Vol. I. Chap. II. Section II.

Modern authors in general ſtrictly forbid much aſſiduity in the removal of bodies of this kind: for they very properly obſerve, that in former times much miſchief was done by exploring wounds with more exactneſs than was requiſite; by which unneceſſary pain was induced, and cures rendered more tedious than they otherwiſe would have been.

But in this matter the moderns ſeem to have gone from one extreme to another: for although much handling of ſores, and a free uſe of probes, forceps, and other inſtruments, are ſeldom neceſſary, it is equally true, that by allowing extraneous bodies, which might have been removed at firſt, to remain in wounds, much future pain and inflammation have been occaſioned.

In ſupport of the practice we are told, that various caſes are on record of extraneous bodies continuing to lodge in different parts of the body without any inconvenience; that this will commonly happen when the ſubſtance is not of a ſtimulating nature; and when it is of ſuch a form or texture as to induce pain, that it will ſoon excite ſuch a plentiful ſuppuration as will quickly throw it out in a much more eaſy manner than if it had been removed at firſt. In anſwer to this, I ſhall obſerve, that where extraneous bodies in wounds cannot be removed without giving the patient a great deal of pain; and eſpecially where there is any riſk of large contiguous blood veſſels being wounded by it; we ought by no means to attempt their removal. In ſuch caſes we ought certainly to truſt to the ſubſequent ſuppuration for throwing them out: But they ought always to be taken out immediately when it can be done with tolerable eaſe, or without injuring any parts of importance. In this way a more expeditious cure is obtained, and we accompliſh our purpoſe in an eaſier manner, than could be done in any future ſtage of the ſore. For in a recent wound, while no inflammation or tenſion takes place, the contiguous parts eaſily ſtretch and yield to the extraction of any ſubſtance that may be lodged in them, if it be not of an angular form, and if the operation, inſtead of being performed quickly, be done with ſlowneſs and caution: whereas, when the contiguous parts become ſtiff and painful, which they always do in the courſe of a ſhort time, any ſubſtance lodged in them is removed with much pain and difficulty: for even after a free ſuppuration has taken place, although the parts will be conſiderably relaxed, yet ſtill they will be more ſtiff and tenſe than they were at firſt; and the opening through which the ſubſtance is to be extracted will likewiſe be much diminiſhed.

We gain another very material advantage by the immediate removal of extraneous bodies from wounds. While a ſore is recent, almoſt every patient will allow every thing to be done which the practitioner in attendance may think neceſſary; but they frequently refuſe, in future ſtages of the ſore, to ſubmit to any thing beſides the uſual dreſſings.

It may be remarked in this place, that of the extraneous bodies that are apt to be lodged in wounds, ſome are more harmleſs than others. A prudent practitioner will therefore be more or leſs anxious in attempting to remove them. Thus we all know, that a lead ball may be lodged very deeply, for a great length of time, without being productive either of pain or inconvenience; while a ſplinter of wood, glaſs, or iron, or even a bit of cloth, will often create a great degree of uneaſineſs. When therefore, it is known that a lead ball is the only ſubſtance that is lodged, if it cannot be eaſily removed, we have at leaſt the ſatisfaction of being aſſured that it will not probably do much harm. We will therefore allow it to remain, either till it be looſened by a plentiful ſuppuration, or till ſome future period, when it may perhaps be diſcovered in a different ſituation, ſo as to be taken out with ſafety at a counter opening: While, on the other hand, when ſuch ſubſtances are lodged in wounds as will probably excite much irritation and pain, it will be much for the intereſt of the patient, and will be the means of preventing much perplexity and trouble to the ſurgeon, to have them removed as ſoon as poſſible after the injury is inflicted.

We have obſerved above, that in removing extraneous bodies from wounds, it ſhould be done with the fingers alone, rather than with forceps. Some few exceptions may occur to this, which we ſhall afterwards have occaſion to mention. But ſubſtances are ſometimes lodged in wounds that cannot be eaſily taken out either with the fingers or forceps. This is particularly the caſe with ſand, duſt, and ſmall pieces of glaſs. Theſe are beſt removed by bathing the parts in warm water, or by pouring water upon them; ſqueezing it gently from a ſponge, or injecting it ſlowly with a ſyringe.

In performing even this very ſimple operation of waſhing a wound, as well as in extracting foreign ſubſtances either with the forceps or in any other way, it is proper to obſerve, that much advantage may be derived from placing the patient in ſuch a poſture as tends moſt effectually to relax the injured parts, ſo as to obtain as wide a ſeparation as poſſible of the lips of the wound. I have ſeen different inſtances where, from want of attention to this circumſtance, patients have ſuffered much unneceſſary pain; where, after various trials, the practitioner has been obliged to deſiſt without accompliſhing his object; and where another practitioner has proved at once ſucceſsful, merely by putting the wounded parts in a relaxed poſition.

After paying due attention to the circumſtances reſpecting extraneous bodies lodged in wounds, our next object is the conduct of the cure.

In inciſed wounds, a ſeparation of the parts that have been divided takes place; and as every wound proves a cauſe of irritation, the ſeparation which at firſt appears, continues for ſome time to increaſe, merely by the contractile power of the injured muſcles. In the uſual way of covering wounds with lint, or with pledgits of ointments, and where the parts have not been previouſly drawn together and retained in their ſituation, an effuſion of a ſerous fluid ſoon takes place from the great number of ſmall veſſels that have been cut. This is afterwards converted into purulent matter: in a ſhort time the ſore is found to be covered with an infinite number of ſmall ſprouts or granulations; and theſe having advanced to a certain extent, a dry pellicle of ſcarf ſkin, termed a Cicatrix, forms over the whole extent of the wound, and thus the cure is completed.

This is the manner in which the healing of wounds is effected, when nature is not aſſiſted by art, or when her operations are only promoted by proper coverings, and protection being given to ſuch parts as are injured. But although, in ſome caſes, this is our only reſource; and although even in this way practitioners have it always in their power to forward the cure of ſores; yet it is liable to many very important objections, which may be obviated by a different treatment.

When a wound is healed in this manner, if the parts which have been divided have ſeparated to any conſiderable extent, the ſuppuration which enſues will be plentiful; by which, if the conſtitution is weak, the patient is apt to be materially injured. In extenſive ſores, this method of cure is always tedious: When deep muſcular parts are injured, the motion of the contiguous joints is apt to be affected, by the divided parts healing when too far ſeparated from each other.

And the cicatrix of a large wound, when cured in this manner, is always ſtiff, unſeemly, and diſagreeable: nor is it poſſeſſed of that ſtrength and firmneſs which the parts beneath require for their protection.

Patients, however, are ſeldom under the diſagreeable neceſſity of ſubmitting to theſe inconveniences: for in general, wounds may be cured in a much more eaſy as well as in a more agreeable manner. We know from experience, that two inflamed ſurfaces of an animal body, when kept in contact, will ſoon adhere together. This was probably at firſt pointed out by accident; but practitioners now derive much advantage from it in various operations, as well as in the treatment of accidental wounds. By drawing ſuch parts as have been divided into contact with each other; and eſpecially by taking care to have them all as completely covered as poſſible with the cutis vera, very extenſive wounds are often quickly cured; the power of moving and of uſing limbs with freedom is often preſerved which otherwiſe would be loſt; the ſcar or mark which remains is ſeldom of any importance; and the wounded parts have the advantage of being ſufficiently protected.

The fact has been long known with reſpect to this point; for there is nothing more certain, than that parts recently divided, will unite firmly together, if they be kept in contact for a ſufficient length of time. The cauſe, however, of this phenomenon has not hitherto been rendered clear. The prevailing idea is, that it proeeeds from a direct inoſculation or junction of the different parts that have been divided; and that thoſe parts only will adhere together which were formerly united. Thus it is imagined in the healing of wounds in this manner, that a divided artery on one ſide of a cut muſt be made to adhere directly with its fellow on the oppoſite ſide; that veins muſt unite with veins; muſcular fibres with fibres of a ſimilar nature, &c. But although it is neceſſary in practice to keep this idea ſo far in view, as to place parts that are to be healed as exactly oppoſite to each other as poſſible; yet this proceeds more from a requiſite attention to ſymmetry and neatneſs in the external parts after the cure, than from any other cauſe: for it is certain, that no ſuch exactneſs is required for the mere adheſion of the divided parts; and whoever doubts of the fact, may with little difficulty prove it experimentally. A membrane may be made to adhere to a bone; and the divided end of an artery or a vein will unite with almoſt any ſubſtance with which it is kept in contact.

It is indeed true, that blood circulates through the cicatrix of a wound; a fact which few will doubt, and which probably gave riſe to the opinion we are now conſidering. But we have reaſon to believe that this circulation does not take place immediately on the formation of a cicatrix. It ſeems rather to be an after proceſs of nature, and is evidently accompliſhed by an infinite number of ſmall vaſcular ſprouts or newly created blood veſſels, which proceed from the larger arteries and veins on each ſide of the wound, and inoſculate with each other ſo as to give a ſufficient circulation in the parts through which they paſs. At leaſt I have found, in different inſtances, on examining the cicatrix of a large wound, that it was always very vaſcular; and I conclude that it happens from a new formation of ſmall blood veſſels, as the divided extremity of every blood veſſel, whether artery or vein, when of ſuch a ſize as to be eaſily diſtinguiſhed, is always ſhut, and even obliterated for a certain ſpace, from the point where the injury happened, in the ſame manner as in arteries that are tied with ligatures, in caſes of amputation and other capital operations. And if this happens in veſſels of a large ſize, there is reaſon to ſuppoſe that it does ſo in thoſe that are ſmaller.

In confirmation of this opinion, we may obſerve, that a circulation of blood betwixt adhering ſurfaces takes place where inoſculation of the kind in queſtion can never occur, from no previous diviſion of blood veſſels having been made. Thus when the ſkin of two contiguous fingers or toes becomes raw or tender, without any blood veſſels being injured, it is difficult to prvent them from adhering; and when they do adhere, a free circulation is afterwards found to take place between them. Other inſtances might be adduced; but I notice this one, as it is not unfrequent, and as it is perfectly applicable to the preſent queſtion.

I therefore conclude, that wounds cured in this way are healed in the ſame manner as adheſion is produced between inflamed ſurfaces, namely, by exſudation of the glutinous part of the blood from the extremities of the divided veſſels; which in the firſt place retains the parts together, and afterwards ſerves to ſupport the new formation of ſmall blood veſſels which nature puts forth as a farther and more certain means of retention.

I have entered into this phyſiological diſcuſſion, imagining that it tends to eſtabliſh a material point in practice. It has commonly been ſuppoſed, that the ſpace of twelve, fourteen, or fifteen days, is neceſſary for the complete adheſion of divided parts: a ſuppoſition which proceeds upon the idea that this adheſion is formed ſolely by the inoſculation of blood veſſels. But if a glutination alone is neceſſary, in the firſt inſtance, to accompliſh this adheſion, it is evident that it muſt be effected ſooner. Accordingly I have uniformly found divided parts adhering firmly about the fifth day; and have known the bandages accidentally removed from wounds on the ſecond and third days, without any ſeparation of the parts newly united being the conſequence. From this it appears, that a ſhorter application of the uſual means of retention will anſwer than is commonly practiſed. Surgeons term this treatment of ſores, Healing by the Firſt Intention; and as it is in every reſpect the moſt deſirable method of cure, it ſhould always be followed when practicable.

In other varieties of wounds, different reaſons often occur to prevent us from curing them in this manner. Theſe we ſhall afterwards have occaſion to mention. But in the ſimple inciſed wound, where the injury has been inflicted with a clean cutting inſtrument, without producing puncture, laceration, or contuſion, the only objection that can occur to it, is our not being able to draw the divided parts into contact, and to retain them in that ſituation till they adhere together. This, however, will ſeldom happen, unleſs a loſs of ſubſtance takes place to a conſiderable degree. Where a large portion of ſkin, with the muſcles beneath, has been entirely cut out, it may in ſome caſes be impoſſible to bring the retracted edges of the wound together; but we may always make them approach ſo as to diminiſh the ſize of the ſore, and may thus have it in our power in every inſtance to forward the cure. In deep tranſverſe wounds, even where no ſubſtance is loſt, the retraction is often ſo great, as to render this practice ſomewhat difficult: But by placing the injured part in that ſituation which tends moſt effectually to relax the divided muſcles, we may effect our purpoſe almoſt in every inſtance. It is indeed ſurpriſing to ſee how completely divided parts will be made to approach, which, while the muſcles were upon the ſtretch, were ſeparated to a conſiderable diſtance from each other. We ſhould not therefore deſpair too ſoon; for even in the worſt caſes we ſeldom fail by due perſeverance to produce ſome very eſſential advantage.

When it is found that the divided parts may be drawn together, we have next to fix upon the beſt and eaſieſt method of retaining them in this ſituation during the cure. There are various means propoſed for this; namely, bandages of different kinds, adheſive plaſters, and ſutures.

The ſides of wounds of a longitudinal direction, ſituated in any of the extremities, and of ſome wounds of the head, may be retained by the uniting bandage. But it ſeldom anſwers in the trunk of the body; nor can it ever prove uſeful in wounds, either in the legs or arms, of a tranſverſe direction: And even where there is reaſon to imagine that it will anſwer ſufficiently well for retaining the ſides of the wound in contact; yet we ought never to truſt to it entirely; for we cannot depend upon it with any certainty for preſerving the ſkin ſmooth and equal: a circumſtance of much importance in the cure.

The eaſieſt method of retaining the ſkin exactly in its ſituation, is by means of adheſive plaſters, applied in the manner repreſented in Plate LXVII. In ſome caſes plaſters alone will prove ſufficient; but when much retraction is expected, the uniting bandage ſhould be applied over them whenever the direction of the wound renders it admiſſible.

Many practitioners, in every inſtance of wound, prefer adheſive plaſters to the uſe of ſutures; but it is in particular caſes only that this preference is proper. Adheſive plaſters may be uſed with advantage in ſuperficial wounds that do not penetrate much deeper than the cellular membrane: and where there is ſuch a loſs of ſubſtance as prevents the ſides of a wound from being drawn cloſe together, they may be employed for the purpoſe of retaining the retracted parts as near to each other as they can be eaſily brought. But in all wounds that penetrate to any conſiderable depth, and when their edges can be drawn into contact, the twiſted ſuture is by much the moſt effectual means of retaining them. For a deſcription of this and other ſutures, we muſt refer to Vol. I. Chap. I. The common interrupted ſuture is indeed more frequently employed than the other; but it does not ſupport the parts with ſuch certainty: the ligatures are more apt to tear or cut out the parts which they ſurround; and they frequently leave diſagreeable marks.

On this ſubject it is the common opinion, that adheſive plaſters and ſutures are admiſſible only in the recent ſtate of wounds. But however deſirable it may be, for various reaſons, to have the application of either

PLATE LXVII.

FIG. 1.

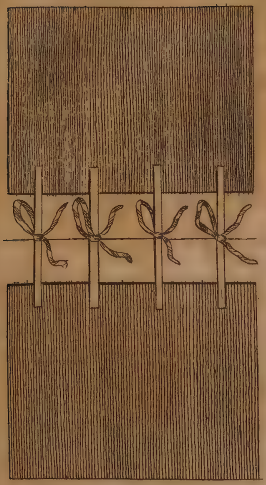


FIG. 2.

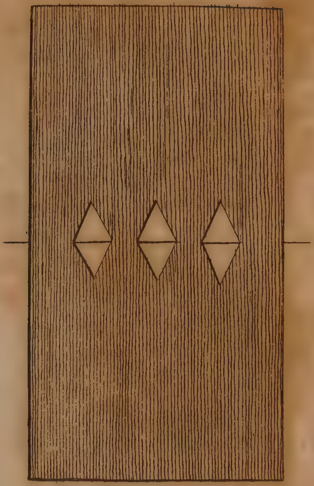


FIG. 3.

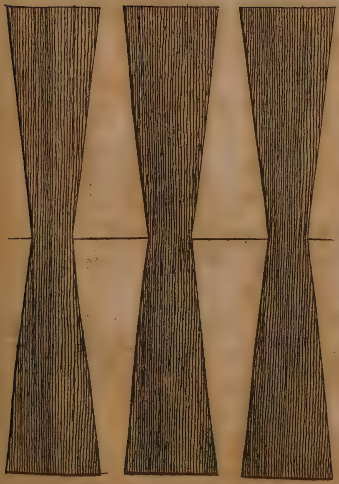
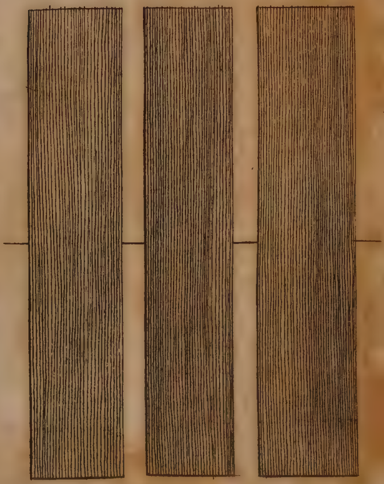


FIG. 4.



ther made as early as poſſible; yet where they have been neglected at firſt, they may be employed with advantage during any ſtage of the ſore: for we are wrong in ſuppoſing, as is commonly done, that wounded parts will not adhere when in a ſtate of purulency. I have repeatedly treated, in this manner, ſores of two, three, and four weeks duration, and always with advantage: Inſomuch, that I believe the practice will very commonly ſucceed in every ſtage of a ſore when the retracted edges can be brought together.

Whether we employ adheſive plaſters or ſutures, we ſhould be very attentive in ſupporting the parts, as far as it can be done, by the poſture of the patient; for if this be neglected, ſutures of every kind will yield ſo as not to anſwer the purpoſe: And along with this, when plaſters are uſed, a farther advantage, as we have already obſerved, may be derived from a proper application of the uniting bandage; but for the reaſons given in the chapter on Sutures, and again when treating of the Hare Lip, in Chap. XXIX. neither this nor any other bandage can with propriety be employed with the twiſted ſuture.

When a wound is treated in this manner, as ſoon as the retracted edges are drawn together and properly ſupported, whether by plaſters or ſutures, no other dreſſings are neceſſary, excepting ſome thin covering of ſoft lint to protect the parts beneath from cold; and with a view to prevent as much as poſſible any acceſs to air, the lint ſhould be ſpread either with ſome unctuous ſubſtance, or with mucilage of any inoffenſive gum.

This being done, the patient ſhould be enjoined to preſerve the injured parts in the poſture that is judged moſt favourable; and care ſhould be taken to put him under proper regulations with reſpect to diet. If he is low and emaciated, he may with propriety have a ſmall allowance of light nouriſhing food; but if he is in any degree plethoric, or liable to inflammatory affections, if the wound is of any conſiderable extent, a ſtrict antiphlogiſtic courſe will be abſolutely neceſſary: for although inflammation to a certain extent be highly neceſſary for the cure of the wound; yet a prudent practitioner will always guard againſt exceſs of inflammation, as productive of much miſchief.

In open wounds, one of the moſt effectual applications for removing extreme degrees of inflammation, is warm emollient cataplaſms; but as they tend to induce the formation of matter, and as this would be directly oppoſite to our views in adopting the mode of cure we are now conſidering, it is evident in ſuch circumſtances that they are altogether unapplicable. But although warm emollients cannot with propriety be employed; yet much advantage may be derived from a prudent uſe of any cold emollient oil or unguent. When the attending ſymptoms of pain and inflammation continue moderate, the dreſſings ſhould never be removed till the cure be completed; but whenever the pain becomes ſevere, as it would probably, if neglected, terminate in a conſiderable degree of inflammation, by which our intention might be fruſtrated, the dreſſings ſhould be immediately taken away, ſo as to admit of the pained parts being freely rubbed or even bathed with an emollient. By repeated applications of this kind, I have ſeen different inſtances of very diſtreſſing degrees of pain being much alleviated, and of the contiguous parts being ſo much relaxed, as to admit of the cure by adheſion going on without interruption. In ſome caſes, however, we are under the neceſſity of employing other means; and of theſe the moſt effectual are opiates and blood letting, particularly local blood letting by means of leeches; which often proves effectual in removing pain and inflammation, when every other application has been tried in vain.

In general, a continuation of theſe means will anſwer the purpoſe: but it ſometimes happens, that notwithſtanding all our endeavours, the pain and inflammation increaſe, and the tenſion of the wounded parts becoming more conſiderable, the plaſters or ligatures with which they have been kept together muſt be taken away, otherwiſe they will do miſchief; and at laſt will yield, ſo as to be productive of no advantage whatever. In ſuch circumſtances it is better to remove them at once; and for the moſt part this will give the patient immediate relief: the pain and tenſion will ſoon diſappear; and a cure will be accompliſhed in the ordinary way: for it might prove hazardous to attempt the ſame method of treatment again.

By theſe means the bad conſequences now mentioned may be obviated: But it is proper to remark, that ſymptoms of this kind are not frequent. In general, the cure goes on without interruption; and where this is the caſe, our views are completed as ſoon as there is reaſon to ſuppoſe that a firm adheſion has taken place between the edges of the wound. We have already remarked, that this proceſs is commonly effected in a ſhorter time than is uſually imagined. In ſuperficial wounds, the ligatures, or other means of retention, may be removed ſooner; but even in deep extenſive wounds, when the habit of body is ſound, they may with ſafety be taken away on the fifth or ſixth day: for by this time all the advantage that can be derived from them will be gained; while much inconvenience, and ſome miſchief, may ariſe from their being allowed to remain longer.

We have already mentioned many of the advantages which reſult from this method of curing wounds. Indeed they are ſo great, that there ſhould be no heſitation in attempting it almoſt in every inſtance: for even when it fails, we are certain that any troubleſome ſymptom that may be induced by it, will be removed by due attention to the means we have mentioned; while much time will be gained when it ſucceeds. Two objections are commonly made to this mode of treatment, which we ſhall ſhortly mention. It is ſaid that the ligatures with which it is often neceſſary to ſecure the arteries, will act as extraneous bodies, and prevent the ſides of the wound from uniting. And it is likewiſe obſerved, that in the courſe of the cure, matter is apt to form; from the lodging of which, troubleſome ſinuſes are produced. Neither of theſe objections, however, is in any degree well founded; at leaſt, I have never met with a ſingle inſtance of either of them. It ſeldom happens that more than one or two arteries in any wound are ſo large as to require to be tied: but I know from experience, that wounds may be cured by drawing their edges together, even where a conſiderable number of arteries have been ſecured by ligatures: for the threads occupy very little ſpace; and when they are applied with the tenaculum, which ought always to be done, they are eaſily removed without any diſturbance being given to the other parts of the wound. And again, with reſpect to ſinuſes being apt to form from this method of treatment, if the edges of a wound be only drawn together above, a cavity will thus be formed beneath, where matter will no doubt be apt to lodge; but this ſhould not be attributed to the method of cure, but to the mode of putting it in practice: for in every wound which ought to be treated in this manner, the whole of the ſides or edges may be drawn together from top to bottom; and by this means the formation of ſinuſes prevented.

We have now to ſpeak of thoſe wounds which do not admit of this mode of treatment. When the edges of a cut cannot be drawn together, after the hemorrhagy is ſtopped, and extraneous bodies removed, we find by experience, that the moſt effectual aſſiſtance we can afford, is to promote as much as poſſible the formation of matter: for the fact is undoubted, in every wound of this kind, that a free ſuppuration proves the moſt effectual relief to every ſymptom; at the ſame time that it appears to be ſo materially connected with the cure, that the healing proceſs never begins till the ſore is covered with good pus; a circumſtance by no means difficult to account for. The cure of ſores healed in this manner, is ſo far effected by nature alone, that although ſome advantage may be derived from art, yet the chief object of practitioners is to remove ſuch impediments as might tend to obſtruct the operations of nature, and to protect the injured parts till the cicatrix becomes ſufficiently firm. Now, as we know that a ſore will never be covered with granulations, or be cicatriſed, as long as it is very painful; and as nothing with which we are acquainted proves ſo mild an application to wounds as pus, we may conclude, that it is chiefly uſeful by preſerving the injured parts in that eaſy, pleaſant ſtate, which ſeems to be indiſpenſably neceſſary for the cure of every ſore. It ſhould therefore be our firſt object, in treating ſores in this manner, to forward the formation of pus as quickly as poſſible; and the moſt effectual method of doing it is, by treating every wound in the ſame manner as we do a common phlegmon; namely, by a free uſe of warm emollient poultices and fomentations. In the firſt place, the parts ought to be immediately covered as completely as poſſible, ſo that they may be protected effectually from the admiſſion of air. When the pain which occurs is exceſſive, poultices may be directly applied, as being the ſureſt means of relieving it: but, when the pain is moderate, it is better to delay the uſe of emollients for a day or two; for as pus cannot be produced till a ſerous effuſion has firſt taken place, and as we know that ſome degree of inflammation is required for effecting this, when the pain and tenſion in wounds are inconſiderable, an immediate application of poultices is apt to do harm, either by preventing altogether, or by retarding and rendering too languid that inflammatory affection which is ſo highly neceſſary for the cure. But in every inſtance of wounds of any conſiderable extent, remedies of this kind prove always uſeful after the firſt two or three days have elapſed: for by this time a ſufficient degree of inflammation has commonly taken place for effecting the wiſhed for effuſion;

fuſion; and we have elſewhere had various opportunities of ſhowing, that in no way whatever can this be ſo readily converted into purulent matter as by a free application of heat; ſo that whenever this remedy is judged to be proper, it ſhould be uſed to the ſame extent as we commonly find to be neceſſary in every caſe of abſceſs.

It is proper, however, to remark, that ſome caution is required in the uſe of this remedy: for although heat, whether conveyed by means of poultices or fomentations, is perhaps the moſt uſeful application in the ſtage of wound we are now conſidering; yet a long continuance of it is very apt to do miſchief, as we have daily opportunities of obſerving where it is employed by thoſe who do not conſider upon what principles it acts in proving ſerviceable. When the purpoſe we have mentioned is gained, namely, a free and kindly ſuppuration, as it is for this only that poultices are uſed, they ſhould now be laid aſide: for when continued longer, they almoſt conſtantly do darm, by relaxing the parts to which they are applied too much; by which they are apt to become pale, ſoft, and ſpongy, inſtead of being of a healthy red colour, and of a conſiderable degree of firmneſs. Nay, they are at laſt often productive of the very contrary effect for which they are employed: for although much inflammation proves always hurtful in the cure of wounds, yet in ſome degree it is in every caſe neceſſary. Now, by continuing the uſe of warm emollients too long, this ſalutary degree of inflammation is ſo entirely carried off, that the matter becomes thin and in too great quantities. And thus troubleſome vitiated ſores are produced, which a different management might have prevented. The period at which the uſe of poultices and other warm applications ſhould be laid aſide, muſt be determined in every caſe by the judgement of the practitioner; but this general rule may be ſafely adopted, That they may at all times be perſiſted in as long as much pain and inflammation continue; but theſe ſymptoms becoming moderate, the diſcharge being good, and the ſurface of the wound covered with granulations of a healthy appearance, they ſhould now be laid aſide. In this ſtate of a ſore, all the advantages are gained which poultices can produce; and a longer continuance of them might occaſion ſome of the inconveniences we have mentioned.

With reſpect to the moſt proper dreſſings for wounds, as we have conſidered this ſubject elſewhere,* it will not be neceſſary to treat of it at preſent with that minuteneſs which otherwiſe would have been proper.

We have already had different opportunities of remarking, that a certain degree of inflammation is neceſſary in the cure of every ſore; but as this very rarely proves deficient, and as there is more to be dreaded from its proceeding too far, eſpecially in the firſt ſtages of large wounds, the mildeſt dreſſings only ſhould be employed. During the progreſs of the cure, much advantage indeed may ſometimes be derived from the application of dreſſings of an irritating, or even of an eſcharotic nature. This, however, is only the caſe when a wound has advanced to the ſtate of an ulcer. While a wound is yet recent, there cannot be a doubt of the mildeſt applications being the beſt. In this country, ſoft dry lint is commonly employed, and by ſome, pieces of ſoft ſponge are recommended; and it muſt be admitted, that they anſwer much better than any of the irritating balſams which till of late were ſo univerſally uſed, and which in moſt parts of Europe are ſtill continued: for it was in Britain that mild dreſſings to wounds were firſt introduced; and it is in this country only where even yet they have been generally received. But although dry lint is an eaſy mild application when compared with many others, yet it is certain that it always creates ſome degree of pain and irritation on being firſt applied; and it is apt to adhere to the edges of a wound, ſo as to cauſe ſome pain and difficulty on being removed. With a view to prevent theſe inconveniences, it ſhould be thinly ſpread with ſome mild emollient ointment; ſuch as Goulard's cerate, or the Unguentum Simplex of the Edinburgh Diſpenſatory. By this means it gives no pain in the application, and it is removed with eaſe, at the ſame time that it ſerves more effectually than dry materials to prevent the air from finding acceſs to the ſore. As dry lint, however, has long been very generally employed in this country, any innovation will not be readily admitted; but what I have adviſed being the reſult of a good deal of experience, I can with confidence recommend it.

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* Treatiſe on Ulcers, &c. Part II.

A piece of ſoft lint, ſpread with any ointment of this kind, being laid over the wound, a bolſter of fine tow ſhould be applied above it for the purpoſe of keeping the parts warm, as well as for abſorbing any matter that may be diſcharged; and this being covered with a compreſs of old ſoft linen, the whole ſhould be retained by a bandage of fine flannel, which is preferable to linen, in ſo far as it is more agreeable to the feelings of the patient, and as it yields to any accidental ſwelling or tumefaction of the neighbouring parts: whereas linen, poſſeſſing little or no elaſticity, is very apt to do miſchief, by remaining ſtiff and immoveable, notwithſtanding any ſwelling that may enſue.

Practitioners are not agreed reſpecting the time at which the firſt dreſſings of ſores ſhould be removed; and nothing deciſive can be ſaid on the ſubject, as in ſome meaſure it muſt be directed by the circumſtances of every caſe. This general rule, however, may be properly adopted, that a ſore ſhould always be dreſſed when it is found to be plentifully covered with matter. This will generally be the caſe about the fourth or fifth day; but as the formation of pus depends upon different circumſtances, particularly upon the health of the patient, and upon the degree of heat in which the parts have been kept, ſome latitude muſt be allowed in this matter. A free uſe of poultices, after the ſecond day, puts it in our power to remove the dreſſings much ſooner than we otherwiſe could do: for they not only promote the formation of matter, but they ſoften all the coverings that have been uſed, ſo as to admit of their being eaſily taken away.

When the cure of a wound goes on without interruption, the ſecond, as well as all the ſubſequent dreſſings, ſhould be preciſely the ſame as the firſt: for our object being ſtill the ſame, no variation, it is evident, can be neceſſary. As nothing proves more hurtful to ſores than expoſure to the air, one great object in our application of dreſſings is to prevent any inconvenience which might ariſe from this. And the ſame reaſon renders it neceſſary to change the dreſſings as ſeldom as is conſiſtent with cleanlineſs; and to be as expeditious as poſſible in the renewal of them. In general, however, no harm will occur from a daily dreſſing of wounds. They ſhould not, but in very particular circumſtances, be dreſſed more frequently; nor can it often be proper to dreſs them ſeldomer than this: for when matter is allowed to lodge for a longer time, the heat in which patients with large wounds are uſually kept, is apt to make it become putrid and offenſive. But as I have elſewhere had occaſion to ſpeak fully upon this ſubject, it is not now neceſſary to enter upon a more particular conſideration of it.* I ſhall juſt obſerve farther, with reſpect to the continuance of mild dreſſings to wounds, that it ought to be regulated by the progreſs of the cure. As long as it continues to advance, they ſhould be perſiſted in; but when the ſore aſſumes appearances in any degree morbid, ſome variety in the dreſſings will be highly proper; and the nature of any change that is to take place muſt be regulated by the particular ſituation of the affected parts. We muſt refer, however, for a more minute conſideration of this part of our ſubject to the different ſections in the Treatiſe on Ulcers alluded to above.

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* Vide Treatiſe on Ulcers, &c.

We have hitherto been ſuppoſing that none of the ſymptoms which take place are violent; in which caſe the cure of every wound will, for the moſt part, go eaſily on under the mode of management we have mentioned. But in ſome caſes the cure is not only much interrupted, but even much hazard is induced by the unuſual height to which ſome of the ſymptoms proceed; and theſe particularly are, pain, inflammation, and convulſive affections of different kinds. We ſhall therefore offer a few obſervations upon the means of obviating theſe ſymptoms, when they proceed to ſuch a height as to prove any interruption to the cure.

A wound cannot be inflicted without inducing pain: for even the ſlighteſt injury which can be done to any part of the body, muſt neceſſarily affect ſome of the ſmaller branches of nerves; by which pain, to a certain degree, will be induced.

It commonly happens, however, that any pain which at firſt takes place in wounds, is not ſo ſevere as to require any particular management: and in general, it ſubſides entirely upon the removal of any extraneous bodies which have been introduced; by protecting the injured parts with proper coverings; and by a plentiful formation of matter. But in a few caſes the pain continues violent after every uſual method of removing it has been attempted. Opiates in large doſes are in ſuch circumſtances more to be depended on than any other remedy; and they do not often fail in giving relief. But it frequently happens that their effect is only temporary, the pain being apt to recur after the ſtrength of the opiate is exhauſted.

In this event we are to ſearch with much care for the cauſe of the pain. It may proceed from ſome particles of extraneous matter which have not been diſcovered; from inflammation of the wounded parts; or from ſome portion of a nerve or of a tendon being partially wounded without being divided; or from irritation over the whole ſurface of the ſore.

We ſhould therefore, in the firſt place, examine the wound with attention, ſo as to be as certain as poſſible that no extraneous matter has found acceſs to it: for when pain is produced by any foreign body lodged in a wound, the removal of it will, for the moſt part, procure immediate relief; while no remedy that can be adviſed will have any effect as long as it is allowed to remain. When any thing of this kind is not readily diſcovered; or when the particles of any extraneous matter that may be lodged in a wound are ſo ſmall that they cannot be removed with the fingers; we have already adviſed the injecting of warm water, by which they will often be waſhed out when every other trial has failed. But when this does not ſucceed, it ſometimes anſwers to immerſe the wound for a conſiderable time, perhaps for an hour, morning and evening, in warm water, or in warm milk; by which particles of matter are ſometimes diſſolved and carried out, which would otherwiſe have continued to excite much uneaſineſs.

If no trial, however, which may be made for this purpoſe, ſhould prove ſucceſsful, we muſt look for ſome other cauſe of the pain; and it will often be found to originate from inflammation. When the external parts of a wound are inflamed, the cauſe of the pain is at once rendered obvious; for even the ſlighteſt degree of inflammation is very readily diſcovered. But it ſometimes happens that the perioſteum, and other deep ſeated parts, are affected in this manner without any external marks of it appearing. This, however, is only the caſe for ſome ſhort period after the inflammation has commenced: for even when it firſt attacks parts that are deeply ſeated, it commonly ſpreads in the courſe of a day or two, ſo as to be diſcovered outwardly; and when this does not happen we may in general be directed to the cauſe, by the heat of the patient's body; by the ſtate of his pulſe; and by the degree of thirſt, which in every caſe of this kind are always increaſed.

When theſe general ſymptoms of fever run high, it is ſometimes neceſſary to take away conſiderable quantities of blood by one or more general blood lettings. But for the moſt part this meaſure is not neceſſary, and our views are obtained with more certainty by local blood letting from the edges of the wound, by means of leeches. In ſuch circumſtances, indeed, no remedy will prove ſo ſucceſsful as the diſcharge of blood in this manner. I have long been in the daily practice of uſing it in every wound where inflammation proceeds to any height; and I have often ſeen great advantages reſult from it. In caſes of pain proceeding from this cauſe, I have known the application of a few leeches to the edges of a wound, procure immediate relief, even where large doſes of opiates, as well as other remedies, had previouſly been tried in vain. And that it is not the quantity of blood, but the manner of diſcharging it, which proves ſucceſsful, is evident from this, that the pain is often relieved immediately on a few drops being taken away by means of leeches, which did not yield in any degree to the loſs of a conſiderable quantity by veneſection. In uſing leeches for this purpoſe, they ſhould be applied as near as poſſible to the edges of the wound; nay, when they will fix within the wound itſelf, the practice proves ſtill more ſucceſsful: but unleſs the inflammation be very deeply ſeated, this meaſure will ſeldom be neceſſary. It ſometimes happens, however, as we have obſerved above, that in deep wounds no inflammation of any importance appears externally, while the perioſteum is diſcovered to be much inflamed and very painful. In this ſituation nothing affords ſo much relief as ſcarifications made in the inflamed membrane, either with the ſhoulder of a lancet or with the point of a ſcalpel. Nor need we heſitate in putting them in practice, on the ſuppoſition of their being apt to produce exfoliations of the bone beneath. Inſtead of this, they tend more certainly than any other remedy to prevent them: for exfoliations ſeldom happen

pen merely from the perioſteum being divided; of which we have daily inſtances in wounds penetrating to this depth, which are rarely attended with this effect; unleſs the bone itſelf be at the ſame time conſiderably injured. In different caſes I have ſcarified the perioſteum in the manner here recommended, which in the mean time tended always to remove the inflammation; while in no inſtance was it productive of any diſagreeable conſequences. On the contrary, there is nothing more apt to induce exfoliation than an inflamed ſtate of the perioſteum, when it is allowed to proceed to the length of ſuppuration: and we know no remedy by which this is with ſuch certainty prevented as by inciſions made in the inflamed parts, and carried to ſuch a depth as to remove the tenſion which commonly takes place.

After as much blood is diſcharged as may be judged proper, whether by leeches or ſcarifications, no application will prove ſo uſeful as warm emollient poultices and fomentations frequently renewed: for in ſuch circumſtances nothing will afford ſuch effectual relief as a plentiful ſuppuration being induced. We conſtantly obſerve, that as long as a wound remains dry on the ſurface, the parts are tenſe, much inflamed, and very painful; and that they become lax and eaſy as ſoon as they are properly covered with purulent matter.

For the moſt part, the means we have mentioned will be attended with the deſired effect; and eſpecially if the operator be not too timid in making the ſcarifications: for we muſt again obſerve, that they may be done with much more ſafety and freedom than is commonly imagined; and when membranes in any ſituation are much inflamed, nothing with which we are acquainted will ſo certainly prevent the acceſſion of gangrene as deep and free ſcarifications. Even this remedy, however, will not always ſucceed: for in ſome caſes the inflammation, inſtead of abating, becomes more and more violent, till at laſt it terminates in mortification. But as we have elſewhere treated fully of this ſubject, it is not at preſent neceſſary to enter upon it.*

When wounds are attended with violent pain, proceeding from inflammation, the cauſe is for the moſt part very readily diſcovered. But ſeverer pain ſometimes exiſts independent of inflammation: for although much pain very ſeldom fails to induce an inflamed ſtate of a wound at laſt, it will often ſubſiſt for a conſiderable time before this takes place. In ſuch caſes, and eſpecially where we have no cauſe to ſuſpect that it ariſes from the lodgement of extraneous matter, it will probably be found to proceed from the partial diviſion of a nerve or tendon: for we know, that in various inſtances the moſt excruciating pain has been induced in this manner.

In ſome caſes, the pain produced in this way is effectually relieved by putting the injured parts into a relaxed ſtate; but, for the moſt part, the only remedy upon which we can depend is a complete diviſion of the wounded nerve or tendon: and as this is a means of cure which may at all times be practiſed without riſk, it ſhould never be delayed when the pain is found to proceed from this cauſe; and eſpecially when, from its violence, there is reaſon to ſuſpect that it may induce convulſions or any other alarming ſymptoms. As a free uſe of the ſcalpel, however, is neceſſary, patients in general do not eaſily ſubmit to this diviſion; nor do we commonly find that practitioners are apt to recommend it. But I can ſay from different inſtances of its beneficial effects, that we ought more frequently to practiſe it: for it ſeldom fails to afford immediate relief, even in the ſevereſt degrees of pain; and I never knew any bad effect reſult from it. It ought always, however, to be adviſed as ſoon as any other means that may be employed have failed: for when violent pain has ſubſiſted ſo long as to induce any material affection of the convulſive kind, even this remedy will not readily remove it. On the parts being freely divided, they ſhould be placed in a relaxed poſture; and an emollient poultice being laid over them, if the practice proves ſucceſsful, the patient will ſoon find himſelf relieved from his diſtreſs, and the wound may afterwards be treated in the uſual way. But when it fails, as it will be apt to do, when from timidity, or any other cauſe, it has been long delayed, there will be much cauſe to ſuſpect that the patient will at laſt die convulſed, notwithſtanding the uſe of opiates, and every other remedy that may be employed.

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* Treatiſe on Ulcers, &c. Part I.

In ſome caſes again, the pain which occurs in wounds, inſtead of being deep ſeated, which it always is when it proceeds from an affection of any particular nerve or tendon, is found to originate from a peculiar degree of irritability of the nerves on the ſurface of the injured parts. The pain, in ſuch inſtances, is not very ſevere; but it often proceeds to ſuch a length as to excite much uneaſineſs, by which the patient is apt to be deprived of reſt, and the matter diſcharged from the ſore to be rendered ſharp and acrid.

For the removal of this kind of pain, emollient poultices, and other warm applications, are commonly employed; but ſeldom with any advantage. Indeed they often ſeem to increaſe the irritability. Large doſes of opium afford the moſt certain relief; and a ſolution of opium in water, or a weak ſolution of ſaccharum ſaturni, are the beſt external remedies. When of a proper ſtrength, they commonly prove ſucceſsful.

While treating of the cauſe and removal of pain in wounds, it was neceſſary to mention inflammation, with the means beſt adapted for the cure of it. We have now to attend to the nature and treatment of ſome convulſive affections which injuries of this kind ſometimes induce.

Subſultus tendinum, and other ſpaſmodic affections of a ſlight nature, are frequent conſequences of wounds: They are more particularly apt to occur from the amputation of limbs, when they often prove the cauſe of much uneaſineſs and pain; for the ſtarting which they are apt to excite in the affected limb, produces a violence of action which muſcular parts newly divided are not well fitted to ſupport. And when they are ſevere, and return frequently, they prevent the dreſſings from being kept properly applied, at the ſame time that they are often the cauſe of hemorrhagies from arteries which have even been tied with ligatures. We ought, therefore, in every inſtance, to treat them with attention. Indeed the riſk of their producing hemorrhagies is ſo conſiderable, and the ſenſations which they communicate to the patient are ſo diſagreeable, that a prudent practitioner will at all times conſider them to be of importance.

As theſe convulſive twitchings are evidently the conſequences of pain and irritation produced by the wound, it is obvious that thoſe means are moſt likely to prove effectual in removing them which are moſt powerful in procuring eaſe. Hence much advantage is derived from placing the patient's body, and eſpecially the affected limb, in the eaſieſt poſture: indeed more benefit is derived from it than we are often aware of. I have known ſevere degrees of this affection relieved almoſt immediately, by changing the poſture of a ſtump. But when this does not prove ſucceſsful, opiates will ſeldom fail.

It is worthy of obſervation, in uſing opium for this purpoſe, that it anſwers better to give it in ſmall doſes frequently repeated, than to give large doſes at once. The latter often produce ſickneſs, and even vomiting; and after their effects are over, the ſpaſms are apt to become more ſevere than they were at firſt; which we ſeldom find to happen when the remedy is uſed in ſmaller doſes, and repeated at proper intervals.

There are other convulſive affections, however, ſtill more alarming, which even in this country ſometimes occur from wounds, but which happen much more frequently in warm climates; the locked jaw, and tetanus. Theſe affections proceed, in many inſtances indeed, from other cauſes; the nature of which we cannot diſcover: but when they are not obviouſly induced by deep or extenſive wounds, they may often be traced, by a more minute inveſtigation, to ſome ſlight injury done to the ſurface of the body. Even the ſlighteſt ſcratch, which does not penetrate to a greater depth than the ſkin, has been known to induce them.

As we know that ſevere degrees of pain are often productive of involuntary contractions of ſuch muſcles as have been injured, we would naturally expect that extenſive wounds would be frequently attended with this effect. But we do not ſo readily ſee how the moſt violent affections of this kind ſhould occur from ſuch wounds as are ſo ſlight as ſcarcely to be noticed, and which never of themſelves produced much uneaſineſs.

Nor do injuries of greater importance induce theſe ſymptoms ſo readily while they are recent and painful: for they ſeldom occur in large wounds till the cure is far advanced; and in ſome inſtances, particularly after the amputation of limbs, they are never more apt to appear than when the cicatrix is nearly completed. At leaſt this has been the caſe in almoſt every inſtance of this kind which I have met with in this country; and we are told from very certain authority, that the ſame obſervation has been made in warm climates.*

The cauſe of this may be difficult to explain; but our knowledge of the fact leads to ſome advantage in practice. We have hitherto been made to ſuppoſe, that the locked jaw, and other convulſive ſymptoms which ſometimes ſucceed to wounds, are moſt apt to occur from the violence of pain induced at, or ſoon after, the time of wounds being inflicted; and therefore practitioners have guarded with moſt aſſiduity againſt them while the pain has continued ſevere. But when it is known that they ſeldom or never occur at this period, and that they frequently appear in more advanced ed ſtages of wounds, thoſe means of prevention which are found to prove moſt effectual, will more readily act with advantage if applied at this time.

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* Vide Obſervations on the diſeaſes incident to Seamen, by Gilbert Blane, M. D. &c.

Practitioners, therefore, in warm climates, ſhould be particularly attentive in the advanced ſtages of wounds; and the moſt effectual remedy which can be applied on the firſt appearance of a locked jaw, is immerſing the patient, ſo as to cover the whole body, in a warm bath. The heat of the bath ſhould be regulated by the feelings of the patient; and he ſhould continue in it as long as he is able to bear it. Water is commonly uſed for this purpoſe; but where milk can be procured, it ſhould be preferred: for as a warm bath proves, in caſes of this kind, chiefly uſeful by its relaxing powers, we have reaſon to ſuppoſe that the oily particles contained in milk render it particularly proper; and the idea appears to be well founded by the beneficial effects which in different inſtances have reſulted from the uſe of it.

It may often happen, however, that milk cannot be procured in quantities ſufficient for this purpoſe. In ſuch ſituations, fat broths, or water combined with oil in any other manner, may be uſed inſtead of it. When one application of a bath proves ſucceſsful, the uſe of it need not to be continued; but for the moſt part ſeveral repetitions of it are neceſſary. Nor are we to imagine that warm bathing is a certain remedy. It has frequently indeed proved highly uſeful, and many cures have been accompliſhed by it; but we muſt likewiſe confeſs that it has often failed, and that patients are daily carried off in warm climates by the locked jaw, and other convulſive ſymptoms, notwithſtanding the moſt ample application of the warm bath, and of every other remedy that has hitherto been employed.

The failure of warm bathing has induced ſome practitioners to make trial of the cold bath; and in ſome convulſive affections it has certainly proved uſeful; particularly in caſes of univerſal tetanus: but as yet it has not been ſo frequently employed as to enable us to judge with preciſion, whether it will often prove uſeful or not in the locked jaw; which we are to conſider as the moſt obſtinate as well as the moſt dangerous ſymptom of this kind.

At the ſame time that we perſiſt in the uſe of warm bathing, other remedies ought not to be neglected; and of theſe opium is the moſt certain. It proves uſeful both as an external application and as an internal medicine. By rubbing the contracted muſcles with laudanum, or by keeping them covered with an extract of opium, or with opium merely ſoftened with ſpirits or water, the ſpaſm has in ſome inſtances been leſſened: but the moſt effectual relief obtained from this remedy is by giving it inwardly; not in large quantities as we have remarked above, but in ſmall doſes frequently repeated. The doſes ſhould be ſuch, however, as may effectually allay the pain and uneaſineſs produced by the diſeaſe; but more than this is unneceſſary: and, when exhibited in large quantities, it ſeems to do miſchief, by inducing that very ſtate of the ſyſtem it was meant to prevent, namely, a great degree of irritability: for as ſoon as the operation of a large doſe of opium is over, we commonly find, in all ſpaſmodic affections, that the diſeaſe returns with double violence. But this may be eaſily prevented, by giving ſuch doſes as the patient can eaſily bear, and repeating them at ſhort intervals, in ſuch a manner that the effects of one may not be over before another is given. Æther and muſk have ſometimes been conjoined with opium; but no advantage of importance has been derived from them.

We have mentioned opium as an external application; but the remedies of this kind from which we would expect moſt advantage are emollients, freely applied over all the contracted parts. The nature of the diſeaſe ſeems ſtrongly to point them out; and experience has, in ſome inſtances, ſhown that they may be uſed with advantage. Emollients of every kind may be uſed for this purpoſe; but animal fats of the ſofter kinds ſeem to be preferable: for they certainly prove more powerfully relaxing in all caſes of contracted muſcles than any of the vegetable oils: at leaſt, in the courſe of my experience, they have uniformly proved to be ſo. By boiling recent bones in water, a very pure oil of this kind is obtained; and the fat of all kinds of fowls anſwers well.

Mercurials have been frequently given in diſeaſes of this kind: but if mercury has ever proved uſeful, it has been in ſuch caſes only where it was rubbed upon the contracted parts in the form of an ointment, and where it would probably act with advantage as an emollient.

When a locked jaw occurs from a wound in any of the extremities, if the diſeaſe does not yield to the remedies we have mentioned, it has been propoſed to amputate the member; and in various caſes this has been practiſed. I am ſorry, however, to obſerve, that we have ſcarcely an inſtance of its proving effectual: for in this diſeaſe, as in almoſt every ſpaſmodic affection, the effect is apt to remain after the cauſe is removed. We have therefore no encouragement, from paſt experience, to put this remedy in practice. Inſtead of proving uſeful, the diſeaſe has, in different inſtances been evidently rendered worſe by it. The remedies therefore which we have to truſt to, are thoſe we have mentioned above, namely, the warm bath, opiates, and a very free application of emollients.

While we are depending on theſe for effecting a cure, the patient's ſtrength ſhould be ſupported by mild nouriſhment given by the mouth, when this can be done; and by glyſters of ſtrong broths, when the jaws are ſo firmly contracted as to prevent food from being received by the mouth: And we may, by removing a tooth or two, even in caſes of this kind, convey food to the ſtomach; ſo that wherever the ſymptoms of locked jaw are obſerved to be approaching, one or two of the teeth ſhould be taken out, as they cannot be removed but with much more difficulty after the jaws are firmly clinched.

Having thus conſidered the various circumſtances relating to wounds in their moſt uſual form, with the means of cure adapted to each of them, we ſhall now proceed to mention more particularly ſome varieties in thoſe affections which point out a different mode of treatment; and theſe are, punctures, laceration, and contuſion.

SECTION III.

Of Punctured Wounds.

A WOUND is ſaid to be punctured when it is made with a ſmall pointed inſtrument; and when the external aperture, inſtead of being wide and extenſive in proportion to the depth, is ſmall and contracted. A wound made by a thruſt of a ſmall ſword is of this kind.

Wounds of this kind prove, in general, more hazardous than inciſed wounds of a much greater extent; from deep ſeated nerves and other parts of importance being more apt to be partially hurt; from extraneous bodies being carried to a depth from whence they cannot be eaſily removed; from the diſcharge which they afford being more apt to lodge; and from the ſides of the punctured parts being in many inſtances made to adhere with difficulty. Theſe are points of the utmoſt moment, not only from their being often productive of much diſtreſs to patients, but from the embarraſſment which they give to practitioners; who are more apt to fail in their treatment of this variety of wound than of any other which falls within their management.

It is obvious, that all the riſk which occurs in theſe wounds proceeds from their being ſo contracted, that free acceſs cannot be got to their full depth: And it is equally evident that this can be obviated only by laying them freely open. Indeed, this is the idea which, in the treatment of punctured wounds, we ſhould always keep in view, that of converting them as far as poſſible into inciſed wounds with wide extenſive openings. This, however, is a queſtion about which practitioners are not agreed: Some adviſe the openings of punctured wounds to be enlarged either with tents or with the ſcalpel; while others allege that this is ſeldom requiſite. And they have alſo differed with reſpect to the time at which any dilatation of this kind ſhould be made; for while ſome adviſe it to be delayed for a few days only, others do not attempt it till every other means have failed.

In the treatment of punctured wounds our views ought to be the ſame as in caſes of ſinus. Indeed, a wound of this kind is exactly a ſinus in a recent ſtate; and by conſidering it as ſuch, the means of cure that will moſt likely prove ſucceſsful are at once pointed out. In every ſinus, our intention is to procure a reunion of the parts which have been divided; but we know from experience that this cannot be effected till a certain degree of inflammation is induced upon them. For this purpoſe, the introduction of a cord or ſeton along the courſe of a ſinus has frequently proved ſucceſsful; and ſome have, with the ſame views, employed irritating injections. When by theſe means the internal ſurface of the ſinus is ſufficiently inflamed, the cure is to be completed, by compreſſion applied in ſuch a manner as to keep the parts intended to be united, in cloſe contact, till a ſufficient degree of adheſion is produced. Now, in the application of this treatment to punctured wounds, it is obvious, that the previous ſteps which we have mentioned for exciting inflammation, would ſeldom if ever be neceſſary; for one certain effect of every wound is to induce inflammation over all the parts which have been injured: So that *à priori* we ſhould be led to conclude, that compreſſion alone would in all ſuch caſes prove ſucceſsful; for we know that it ſeldom fails in other caſes of ſinus where a due degree of inflammation is induced. But we are deterred, in punctured wounds, from the immediate uſe of this remedy; at leaſt where they penetrate to any conſiderable depth, from our uncertainty with reſpect to extraneous bodies being lodged in them or not, and from the inflammation in wounds of this kind being apt to run too high. In ſuperficial wounds, indeed, where we are certain of being able to extract any extraneous matter, and where the inflammation is for the moſt part moderate, compreſſion may be employed immediately; and when properly applied, it will not often fail. But for the reaſons juſt mentioned, it can ſeldom be employed with ſafety in wounds of much importance.

The practice I have long adopted in wounds of this kind is this: When they run in ſuch a direction as to prevent a ſeton from being carried along their whole courſe, I lay them open immediately from one extremity to the other, or as far as it can be done with ſafety, either with a probe pointed biſtoury, or with a ſcalpel and director: and this being done, the parts are dreſſed in the manner we have adviſed above, in caſes of ſimple inciſed wounds. But when it appears that a ſeton can with propriety be uſed, emollient poultices are firſt applied, and continued till a free ſuppuration is induced, and till there is no longer any cauſe to fear that the ſymptoms of inflammation are to proceed too far. A cord is then introduced nearly equal to the ſize of the opening; and being allowed to remain till there is reaſon to imagine that any extraneous matter lodged in the wound is diſcharged, it is then gradually leſſened, by taking away a thread or two every three or four days; and when reduced to a third or fourth part of its original thickneſs, it is taken out entirely; when the remainder of the cure is for the moſt part eaſily effected by the application of moderate preſſure along the courſe of the wound.

When a punctured wound is laid open at both ends, a cord may be eaſily introduced by means of a blunt probe, with an eye at the end of it. But when the inſtrument has not paſſed through the integuments on the oppoſite ſide to which it entered, a counter opening muſt be made, either by cutting with a ſcalpel on the round end of a blunt probe, or by paſſing a lancet pointed needle, covered with a canula, along the ſinus, and puſhing it out at the oppoſite ſide with the ſeton attached to it.

In either of theſe ways the cure of ſuch wounds may often be accompliſhed. But wherever the practice is admiſſible, I am clearly of opinion, that laying them open immediately after the accident, is preferable to the other: for by means of it all extraneous bodies are at once brought into view; hemorrhagies are eaſily reſtrained; and all that pain and trouble which ſometimes occur from a partial diviſion of nerves or tendons are directly obviated. Nor is the inflammation, which often ſucceeds to punctured wounds, apt to run ſo high as it uſually does when any other mode of treatment is adopted. So that much diſtreſs would be prevented, and much time ſaved, if this method of cure was more generally practiſed. To thoſe not much accuſtomed to this kind of buſineſs, the enlarging of a ſmall puncture, ſo as to form an extenſive wound, appears to be unneceſſary and cruel: but whoever has ſeen much of this branch of practice will know, that the greateſt diſtreſs often ariſes from the ſmalleſt punctures; that ſurgeons are often baffled and much diſappointed in their treatment of them; and he will ſoon find, that nothing ſo effectually obviates this as the practice we have mentioned, that of laying the punctures freely open as ſoon as poſſible after they are inflicted. Indeed, the ſooner it is done, the better. No advantage can accrue from delaying it; and a patient always ſubmits to it moſt readily at firſt, while at the ſame time it is productive of leſs pain than it muſt neceſſarily give when the parts are ſwelled and inflamed, which they commonly are in the courſe of a few days from the time of ſuch injuries being inflicted. In every wound therefore, of this kind, particularly in thoſe which are often received in duels with ſmall ſwords, and in battles with the points of bayonets, the enlargement ſhould take place even before the parties are carried from the field; by which many inconveniences which naturally attend theſe injuries would be prevented.

There are ſome caſes, however, in which this practice cannot with propriety be followed; in punctures which run deep among the large muſcles; and eſpecially in ſuch as are contiguous to any of the large blood veſſels and nerves. As more danger would accrue from wounding theſe than could probably be compenſated by any advantage gained by dilating the wounds, it is better in ſuch circumſtances to reſt ſatisfied with laying the parts open as far as it can be done with ſafety; to truſt to the ſuppuration which will enſue for bringing off any extraneous matter that may be lodged in the wound; and to a proper application of preſſure for completing the cure. Or the practice we have mentioned above, of introducing a ſeton, may be attempted; for a cord may be paſſed with ſafety where it might be very improper and even dangerous to make a deep inciſion.

But it is proper to obſerve, that there are ſome caſes in which even a ſeton cannot be introduced: for a puncture ſometimes runs in ſuch a direction, as not to admit of a counter opening. We muſt here truſt to a proper application of preſſure, not merely for preventing any lodgement of matter, but for effecting a cure by producing an adheſion of the divided parts; and when this fails, injections of a moderate degree of aſtringency may be uſed with advantage: but as remedies of this kind tend to counteract the very intention for which ſetons are employed, they ſhould never be adviſed till it appears that the latter will not ſucceed. Setons, as we have already obſerved, prove uſeful, by exciting inflammation along the courſe of a ſinus. Now, one uſual effect of aſtringent applications is, to diminiſh or even to remove inflammation. They ſhould never therefore be employed till all the ordinary means of cure have failed, when they may be uſed with a view to check the flow of matter when it is diſcharged in too great quantities, and in order to induce ſome degree of calloſity over the ſides of the ſores.

We think it right in this place to remark, that practitioners have differed much in their opinions with reſpect to the uſe of aſtringent injections in wounds: for while ſome are in the daily habit of employing them, others have ſaid that they are always pernicious, and ought never to be uſed. In the early ſtages of wounds they can never be neceſſary; and as they may do harm by waſhing away the matter too freely, they ſhould never be uſed as long as a cure is expected, either by the formation of new granulations, or by adheſion: but whenever we have reaſon to conclude that this cannot probably happen, we may with propriety recommend them. Various forms of them are mentioned by authors; but none of them are ſo harmleſs, and at the ſame time anſwer with ſuch certainty, as weak ſolutions of ſaccharum ſaturni. Lime water is uſed with the ſame views: and water ſtrongly impregnated with alum, or mixed with an equal quantity of claret or port wine, is often employed with ſucceſs.

In the treatment of punctured wounds where ſetons cannot be employed, it is ſometimes difficult to prevent the external aperture from cloſing long before any tendency to heal appears in the bottom of the ſore; and if it be not prevented, much miſchief is apt to enſue by matter collecting beneath, and burſting out from time to time. With a view to prevent this diſagreeable occurrence, tents are employed of prepared ſponge, gentian root, and other articles, which, by ſwelling with the moiſture of the ſores, ſerve very effectually to keep them open. But while they anſwer this purpoſe, they are very apt to do miſchief. When the opening of a ſore is plugged up with a tent, the matter which forms can never be diſcharged but at the renewal of the dreſſings; by which means it will neceſſarily collect in ſuch quantities as to give riſe to abſorption, as well as to the formation of ſinuſes, by the matter ſpreading between the layers of the contiguous muſcles. Tents, therefore, which are of ſolid materials, ought never to be of ſuch a magnitude as to fill the openings of ſores. They will not readily do harm when they are of ſuch a diameter as to admit of a diſcharge of matter while they are inſerted. But when they are employed of ſuch ſizes as to fill the openings entirely, they ought always to be hollow; by which the apertures into the ſores will be prevented from contracting, while the matter will be diſcharged as quickly as it is formed. For this purpoſe practitioners ſhould be provided with tubes of different forms and ſizes, ſo as to be able to ſuit any aperture they meet with. Silver tubes are commonly employed; but thoſe of lead anſwer better. Being ſofter than the others, they do not create ſo much uneaſineſs, and they are more readily formed into any particular ſhape, ſo as to anſwer for ſinuſes of a ſtraight or crooked direction.

We muſt obſerve, however, that tents and tubes of every kind ſhould be uſed with caution; and it is more particularly neceſſary that this ſhould be held forth to beginners, for there is no point in practice in which they are more apt to err. As they are early made ſenſible of the danger which enſues from matter being allowed to collect in ſores, they very univerſally fly to the aſſiſtance of tents wherever a puncture or a ſinus is diſcovered. But it is right they ſhould know that tents are ſeldom neceſſary: for when once a vent is given to matter, the opening will in general be preſerved merely by the continuance of the diſcharge, In a few inſtances, indeed, it is otherwiſe; and in all ſuch caſes the leaden tubes ſhould be preferred.

We come now to ſpeak of thoſe wounds which are attended with laceration and contuſion; and as both of theſe circumſtances require nearly the ſame method of treatment, it will not be neceſſary to ſpeak of them in ſeparate ſections.

SECTION IV.

Of Lacerated and Contuſed Wounds.

A WOUND is ſaid to be lacerated, when the parts, inſtead of being divided with a ſharp cutting inſtrument, are forcibly torn aſunder; and when, inſtead of a ſmooth equal ſurface, the edges are ragged and unequal: And we conclude, that contuſion takes place when a wound has been made with a blunt or obtuſe body.

Contuſed and lacerated wounds differ in many points from ſimple inciſed wounds; but in nothing more than in this, that while they are commonly more hazardous, they ſeldom at firſt exhibit ſuch alarming appearances. Thus a ſimple cut, which commonly heals with eaſe, is often attended with a much greater retraction of the divided parts, and with more profuſe hemorrhagy than a contuſed or lacerated wound. Indeed, it is a frequent effect of contuſion and laceration to prevent the effuſion of blood, by which inattentive obſervers, in forming opinions of injuries of this kind, are very apt to be deceived: for as hemorrhagy is the moſt alarming ſymptom with which wounds are attended, when it does not occur to any great height, they are apt to conclude that nothing bad can happen. Practitioners of experience, however, will not be deceived by this: for it has long been known, that injuries of this kind prove always more dangerous than any other kind of wound; and the more violent the contuſion or laceration has been, the leſs blood is always poured out, inſomuch that there are inſtances even of limbs being torn off without any hemorrhagy enſuing.

The pain of lacerated and contuſed wounds generally varies according to the violence of the injury. Thus, in leſſer contuſions, the pain is often ſevere, while it is apt to be inconſiderable where the nerves of any part have been completely deſtroyed.

The immediate effect, both of laceration and contuſion, is ſwelling or tumefaction, which always takes place in a greater or leſſer degree in the retracted edges of the wound. This ſeems to be the conſequence of effuſion into the ſurrounding cellular ſubſtance. When the violence has not been ſevere, this effuſion commonly terminates in ſuppuration; the contuſed parts ſeparate from thoſe beneath in the form of ſloughs; and a cure of the remaining ſore is obtained by the means we pointed out when ſpeaking of ſimple inciſed wounds. But when the parts are ſo much injured as to have their texture much deſtroyed, and eſpecially when any of the larger arteries have been obliterated, there will always be cauſe to ſuſpect that mortification will occur. In ſound conſtitutions, and where the wound is not extenſive, even this will not often prove fatal: for in ſuch circumſtances the mortified parts commonly fall ſoon off, and a cure is afterwards effected in the uſual manner. But in wounds attended with contuſion or laceration to any conſiderable extent, if the habit of body be not perfectly good, the gangrene which enſues is always to be conſidered as hazardous: for the diſeaſe does not neceſſarily ſtop with the parts which have been injured; but is apt to proceed to thoſe which were not immediately hurt by the accident.

And again, even where mortification does not ſucceed immediately, when parts have been either much lacerated or contuſed, ſuch a violent degree of inflammation is apt to occur as often terminates in mortification,

tion, notwithſtanding all our endeavours to prevent it; and in whatever way the diſeaſe be induced, it is always attended with much danger: for beſides the riſk of parts being deſtroyed by it, which are immediately neceſſary for life, the abſorption of putrid matter from a gangrenous ſurface, proves often ſuddenly fatal, even when the ſize of the ſore is ſo inconſiderable as to give no cauſe to ſuſpect danger.

It is therefore obvious in the treatment of contuſed and lacerated wounds, that our principal object is to guard againſt the acceſſion of gangrene. But it is likewiſe clear, that this is not always to be done by the ſame ſort of means: for we may readily ſuppoſe, that much advantage may be derived from blood letting, and other evacuations, where the injured parts are highly inflamed, while no benefit would probably reſult from them in any other ſituation. This, however, is a point of importance, and merits particular attention.

In lacerated or contuſed wounds, where the parts are much injured, it is the common practice to give large quantities of bark almoſt immediately, and to apply warm dreſſings and other antiſeptics with a view to prevent gangrene. It is evident, however, that the indiſcriminate adoption of this practice muſt frequently do miſchief: for however beneficial it may be in particular caſes, where gangrene has already taken place, it is certain that it will rather do harm where ſymptoms of inflammation ſtill continue violent; and unleſs mortification actually exiſts, it is not clear that in any inſtance it will prove ſerviceable; for although we have various proofs of the efficacy of bark in putting a ſtop to the progreſs of gangrene, I have never in any caſe been ſenſible of any advantage being derived from it when uſed as a preventative of it.

Gangrene may ariſe in theſe wounds from two cauſes: From the ſtoppage of the circulation by the total deſtruction of the large blood veſſels of a part; and from violent inflammation.

Gangrene, proceeding from inflammation, is moſt to be dreaded here; for that which ariſes from the deſtruction of blood veſſels is by no means ſo frequent. The inflammation therefore which takes place in wounds of this kind, will always demand our attention in the firſt place.

As the hemorrhagy, ſubſequent to contuſion or laceration, is ſeldom alarming, and as blood diſcharged from any of the veſſels that have been injured tends more effectually than any other remedy to prevent inflammation; ſuch quantities ſhould be taken away in this manner as the nature of the injury may indicate, and as the ſtrength of the patient may admit. After this, if the divided arteries continue to throw out blood, they muſt be ſecured by ligature: for till the diſcharge of blood be ſtopped, the patient will not conſider himſelf as ſafe; nor can the wound be examined with accuracy. The parts are now to be cleared of all extraneous bodies, as far as this can be done with propriety, and are to be placed as much as poſſible in their natural ſituation; but no kind of ſuture ſhould be employed for their retention. If the violence which has been done to them has been conſiderable, and eſpecially if the patient complains of much pain, it will be ſtill neceſſary to take away blood in proportion to the ſtrength of the patient: and as local blood letting proves in ſuch caſes always highly ſerviceable, the beſt method of diſcharging it is by means of leeches, applied as near as poſſible to the edges of the ſore. Indeed no remedy I have ever employed proves ſo certainly uſeful as the diſcharge of blood in this manner; for it not only tends to prevent the inflammatory ſymptoms from running high, but it very commonly renders the pain moderate, even when it has previouſly been ſevere. It ought never therefore to be omitted; but the practitioner ſhould take care that it be proportioned as nearly as poſſible to the violence or urgency of the ſymptoms: for the diſcharge of a ſmall quantity of blood will in ſome caſes of contuſion or laceration prove fully ſufficient; while in others, it is neceſſary to repeat the operation once and again.

As ſoon as a ſufficient quantity of blood is diſcharged, the parts affected, after being dreſſed with pledgits of any emollient ointment, ſhould be completely covered with a warm emollient poultice; and this, together with warm fomentations, ſhould be renewed three or four times a day, ſo as to promote, with as much certainty as poſſible, the formation of pus. To induce ſuppuration in wounds of this kind, is indeed an object of the firſt importance: it generally relieves all the ſymptoms; and till ſuch time as it takes place, we have often reaſon to dread the event.

We commonly find, when ſores of this deſcription become covered with good pus, that the pain and tenſion abate; and ſuch of the parts as have been much lacerated and contuſed, and which hitherto have been ſloughy or perhaps black with mortification, begin now to ſeparate from thoſe beneath: and this being accompliſhed, they may in general be cured in the ſame manner with wounds of any other kind. Nay, when brought to this healing ſtate, we may even attempt with ſafety to expedite the cure by drawing the edges of the retracted ſkin into contact, either by means of the uniting bandage or with adheſive plaſters; for although this would be improper in the commencement of ſuch wounds, while there is any riſk of the tenſion and inflammation proceeding too far, it may with much propriety be adviſed when there is no longer any reaſon to be afraid of theſe ſymptoms.

When practitioners are immediately called, ſo as to employ the means we have mentioned in due time, they will not often fail in ordinary caſes: but it frequently happens, whether from the violence of the injury, the tendency in ſome conſtitutions not only to inflammation but to gangrene, or from the proper remedies not being timely applied, that all the ſymptoms become daily worſe, and, notwithſtanding repeated blood lettings, both general and local, all thoſe parts which were at firſt inflamed become perfectly black and mortified. We are not now to truſt to evacuations: on the contrary, whatever tends to debilitate ſhould be avoided; and we know from experience, that, in this ſituation, no remedies prove ſo uſeful as thoſe which invigorate and reſtore the tone of the conſtitution.

With this view, the patient ſhould be deſired to live upon nouriſhing food. He ſhould be allowed as large a quantity as he can take, of good wine, or of ſtrong malt liquor, or of both; and Peruvian bark ſhould be given in as large doſes, and theſe ſhould be as frequently repeated, as his ſtomach will permit. Indeed bark is perhaps the only remedy on which we can place any dependence; and as we know from experience that it may with ſafety be given in great quantities, it ſhould always be exhibited in caſes of this kind without farther limitation than what neceſſarily ariſes from the ſtate of the ſtomach. We may remark, too, that it proves in general uſeful nearly in proportion to the quantity which is taken; and it often happens, that large doſes are not more nauſeated than thoſe which do not contain above half the quantity. Where it is of importance to throw in a large quantity of the remedy in a ſhort ſpace of time, as is always the caſe in gangrene, it ſhould never be given in leſs than doſes of a dram, or even of two drams when the patient can bear it; and theſe ſhould be repeated every hour. Bark, in ſome caſes, ſeems to prove more powerful when conjoined with the vitriolic acid: elixir of vitriol may therefore be given along with it. In gangrene ariſing from debility, opium frequently proves uſeful; and as it does not counteract the bark, the two remedies may with ſafety be preſcribed together.

In the mean time, the ſtate of the ſore muſt be particularly attended to. As long as there is any tendency in the contiguous parts to inflammation, the beſt applications, perhaps, are warm emollient poultices and fomentations; for, as we have elſewhere ſhown, that the ſeparation of mortified parts is commonly effected by a ſuppuration taking place between them and the adjoining ſound parts, we neceſſarily derive moſt advantage from whatever tends to promote it.* But as no ſuppuration will occur without ſome degree of inflammation, when there is no reaſon to imagine that this will otherwiſe happen, we ſhould endeavour to excite it by the application of warm dreſſings to the ſore, and eſpecially by the uſe of ſtimulating ſubſtances to the contiguous ſound parts. Muſtard applied in the form of a poultice, as well as ſome others of the rubefacients, have proved uſeful in this manner; and I have employed with advantage a ſtrong ſolution of crude ſal ammoniac in vinegar and water. It is proper, however, to obſerve, that this practice muſt be managed with caution: for much inflammation might often prove detrimental, while in every inſtance it would be unneceſſary; for we know from experience, that a ſmall degree of it proves always ſufficient. As ſoon, therefore, as it is obſerved that the mortified parts are ſurrounded with a kind of inflamed ring, the ſtimulating applications ſhould be removed in order to give place to warm emollients for the purpoſes mentioned above. Any parts that are completely mortified may with ſafety be removed; indeed the offenſive ſmell which they produce renders this a neceſſary meaſure: but the common practice of making inciſions through the diſeaſed parts into thoſe beneath which are ſtill ſound, ſhould never be adopted. No advantage can be derived from it, and it may be productive of much harm. It is recommended with the view of giving more free acceſs to the ointments, and other remedies uſed as dreſſings, than could otherwiſe be obtained; but I have not in any inſtance ſeen it prove uſeful, and in different caſes I have been ſenſible of its doing miſchief. It may very readily carry the putrid matter of gangrene more deeply into the contiguous ſound parts than it would otherwiſe penetrate. In ſome caſes it has evidently induced more inflammation than was neceſſary; and in more inſtances than one I have known ſcarifications prove hurtful, by exciting very troubleſome hemorrhagies.

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* Vide Treatiſe on Ulcers, &c. Part I. where this ſubject is more fully conſidered.

By perſiſting in the uſe of bark, and of the other remedies we have juſt mentioned, and eſpecially if the ſtrength of the patient be ſupported with wine and nouriſhing food, even bad caſes of gangrene will often terminate happily; the mortified parts will ſeparate, and the remaining ſore will heal kindly and eaſily with common mild dreſſings: But in other inſtances, notwithſtanding all our endeavours, the diſeaſe will continue to ſpread, and nothing will prevent its fatal termination. When gangrene is ſeated in any of the extremities, it is the common practice, when other means of cure fail, and when the mortification is ſtill advancing, to amputate above the diſeaſed parts: we have elſewhere ſhown, however, that this practice ſhould not be adopted; and when treating of amputation, we ſhall again have occaſion to enter on the conſideration of it.

In the treatment of mortification, it is a good general rule to be very ſparing of every evacuation from the firſt appearance of the diſeaſe, and this eſpecially with reſpect to blood letting. But in addition to what I have already obſerved, I think it right to remark, that in all caſes of inflammation where the approach of gangrene is dreaded, and particularly in wounds attended with much contuſion or laceration, till mortification actually occurs, we ſhould proceed with freedom in an antiphlogiſtic courſe, particularly in diſcharging as much blood as the degree of inflammation may appear to render neceſſary; and I inſiſt on this point the more fully, from having often obſerved much miſchief enſue from practitioners being too timid in adviſing it. Being afraid of ſinking the patient too much, they avoid the only remedy that could probably ſave him: for, in ſuch circumſtances, it is the violence of the inflammation of which we have moſt reaſon to be afraid; and as we know of no remedy which can with ſuch certainty be depended upon for removing inflammation as blood letting, it ſhould be preſcribed with as much freedom as the ſtrength of the patient and other circumſtances will permit; by which the acceſſion of gangrene will often be prevented when all the uſual remedies would probably fail.

What we have hitherto ſaid in this and the preceding ſections, may be conſidered as common to wounds in general: We now proceed to conſider thoſe wounds, which, either from the nature of the part wounded, or from its ſituation, demand a peculiar treatment.

SECTION V.

Of Wounds in the Veins.

IT is difficult to reſtrain the hemorrhagies which ſometimes enſue from wounded arteries, on account of the force with which the blood is propelled into them by the heart, and on account of their muſcular coats, which prevent them from collapſing readily. But in the veins neither of theſe circumſtances take place; the contractile power with which they are endowed is very inconſiderable; and we do not perceive that the circulation in them is much affected by the action of the heart.

For theſe reaſons, wounds in the veins heal with more eaſe, and are attended with leſs danger than wounds of the arteries: Indeed we know, that the largeſt veins are often much injured, and that no bad ſymptom will enſue; while very troubleſome conſequences will follow from wounds even of ſmall arteries. In general, therefore, we have no great reaſon to be afraid of wounds in the veins: for while we have it in our power to check the hemorrhagy, we never obſerve any detriment to enſue even from the obliteration of the largeſt external veins; for the anaſtomoſing branches ſo readily admit of dilatation, that they ſoon become ſufficient for carrying on the circulation beyond the parts affected.

We commonly find, that a longitudinal cut in a vein heals with eaſe when it is ſlightly covered with a piece of dry lint or ſoft old linen: When this fails, the hemorrhagy may be always ſtopped by the application of a piece of dry ſponge or of agaric to the bleeding orifice, and ſecuring it with moderate preſſure. But in tranſverſe cuts in the large veins, or when any of them are cut entirely acroſs, it may ſometimes happen, either that preſſure cannot be properly applied to the wound, or that it does not prove ſufficient for ſtopping the diſcharge: In ſuch caſes, eſcharotic applications are commonly adviſed, and by ſome practitioners the actual cautery is employed; but none of theſe can be depended on; and they are apt to create a good deal of uneaſineſs. The ſame remedy therefore ſhould be employed here that we daily uſe in hemorrhagy from wounds in the arteries, namely, ligatures; which, when properly applied, neither fail in their effects, nor produce any material inconveniency. In the application of ligatures, we have elſewhere ſhown, that the crooked needle ſhould ſeldom or never be uſed, and that the tenaculum alone ſhould be employed.

SECTION VI.

Of Wounds in the Lymphatics.

THE lymphatics are equally liable to injuries with other parts of the body: As they often lie contiguous to veins, they are ſometimes wounded in the operation of blood letting; and they are not unfrequently cut in opening buboes and other glandular collections of matter.

When the ſmaller branches only of lymphatics are opened, we may readily ſuppoſe that they will heal along with the reſt of the wound; but the wounded lymphatic is ſometimes ſo large, that it does not heal ſo ſoon as the other parts, but continues to pour out its contents in conſiderable quantity, giving a good deal of inconveniency, and at the ſame time weakening the patient: We ſhould never heſitate therefore in putting a ſtop to the diſcharge.

Various means have been propoſed for effecting this. In ſome caſes it has been done by compreſſion alone: Aſtringents have been adviſed, together with the application of dry ſponge, agaric, and of common puff ball; and both the actual and potential cauteries have been uſed. But when moderate preſſure fails, the moſt effectual remedy is the taking up the injured lymphatic with a ligature, in the ſame manner as we do wounded arteries. No objection can be made to this, and it anſwers the purpoſe in the moſt certain manner.

SECTION VII.

Of Wounds in the Nerves and Tendons, and of Ruptures of the Tendons.

WHEN treating of blood letting, as well as in a preceding part of this chapter, I had occaſion to ſpeak of the conſequences which ſometimes enſue from partial diviſions of nerves and tendons, and of the means which ſeem to be beſt adapted for removing them. At preſent it might be ſufficient to refer to theſe parts of the Work; but I ſhall now make a few additional obſervations.

It muſt often happen, that nerves and tendons are partially divided along with other parts; but when no pain ariſes from it, this accident does not particularly come under the obſervation of practitioners. In ſuch caſes they heal along with the other parts of the wound: But in various inſtances, either from ſome ſingular degree of irritability in the injured parts, or from a peculiarity of conſtitution, which we cannot explain, the ſlighteſt puncture of a nerve or of a tendon, will induce very ſevere pain, inflammation, convulſions, and even death.

Whenever we have reaſon to ſuſpect, from the violence of the pain, that the other ſymptoms may ſupervene, the moſt effectual means ſhould be immediately uſed for preventing them: for when once convulſions take place, we are never certain of being able to allay them. In ſome caſes, large doſes of opiates anſwer the purpoſe: but when they do not very quickly prove ſucceſsful, no time ſhould be loſt in putting the only remedy in practice, on which we can place much dependence; and that is, the complete diviſion of the injured nerve or tendon. By this we may indeed induce a certain degree of inſenſibility in the parts beneath, or they may even be deprived of the power of voluntary motion; but any inconvenience which this may occaſion will be trifling, when compared with the advantages which reſult from the operation: For I can from experience aſſert, that it ſeldom fails in removing all the ſymptoms, when it is timely employed; while, in different inſtances, wounds of this kind have terminated in death where it has been omitted.

In this manner we may obviate the effects of punctures and partial wounds, either in the nerves or tendons: But it is neceſſary to mention the method of treatment to be purſued in the healing of wounds or ruptures of the large tendons, when they are completely divided. As a complete diviſion of any of the large tendons is always attended with much retraction, it was long ago inculcated by practitioners, to draw the retracted extremities of the ruptured tendon into contact, and to retain them in this ſituation by ſutures: and this being done, and the limb placed in a favourable ſituation, the reſt of the ſore was treated in the uſual way.

There is no reaſon to doubt of cures having been often accompliſhed in this manner: nay, where tendons have been merely ruptured, without any external wound, as often happens with the tendo Achillis, the retracted ends of the tendon have been laid bare by an inciſion, for the very purpoſe of retaining them by ſutures. This, however, is a very painful operation; and as the ſame intention may be accompliſhed in a much more ſimple manner, it ought to be laid aſide. When it was firſt propoſed to unite ruptured or wounded tendons by means of ſutures, it was the common opinion, that in order to inſure a reunion of divided parts, it was abſolutely neceſſary to bring them into cloſe contact; and the ſame idea prevailed, not merely with reſpect to tendons, but with regard to bones, as well as other parts.

In the treatment of fractured bones and of ruptured tendons, it is no doubt a right general rule to endeavour to bring the divided parts as nearly into contact as poſſible: but we now know that cures may be accompliſhed where the retraction of parts is ſo conſiderable as to render it impoſſible to draw them together; nay, that it has often been done, even where a portion of a tendon or of a bone has been completely removed. Very conſiderable portions of bone have been regenerated; and although we are not certain that any part of a tendon has ever been renewed, yet ſuch adheſions always take place between the retracted ends of the divided tendon and the contiguous parts, as tend in a great meaſure to ſupply the deficiency. Thus I have known different inſtances of the tendon of the rotula being ruptured, as well as of the tendo Achillis: and although the ends of the retracted tendons could never be brought within an inch of each other; yet in all of them where proper attention was given, the cures have been ſo far complete, that the uſe of the limbs has been very perfectly reſtored. Some degree of ſtiffneſs has often indeed remained for a conſiderable time; but at laſt even this ſymptom has very commonly been removed.

Wherever a wounded tendon may be ſituated, or even where it is only ruptured, without any injury being done to the external parts, the limb ſhould be placed in ſuch a manner as will moſt readily admit of the retracted ends of the tendon being brought nearly together; and when in this ſituation, the muſcles of the whole limb in which the injury has happened muſt be tied down with a roller in ſuch a way as will prevent them from all kind of exertion during the cure, at the ſame time that the parts are placed in ſuch a poſition as will tend moſt effectually to keep them eaſy and relaxed. Thus, in a wound or rupture of the tendon of the rectus muſcle of the thigh, the patient's leg ſhould be kept as much as poſſible ſtretched out during the cure, when the thigh ſhould be in ſome degree bent, ſo as to relax the muſcle itſelf as far as it can be done. While in ſimilar affections of the tendo Achillis, the knee ſhould be kept conſtantly bent, ſo as to relax the muſcles of the leg as much as poſſible; at the ſame time that the foot ſhould be ſtretched out, ſo as to admit of the ends of the ruptured tendon being brought nearly into contact. In applying a roller to ſecure the muſcles and tendons in this ſituation, it ſhould be done with a firmneſs quite ſufficient for the purpoſe, at the ſame time that care is taken to prevent it from impeding the circulation: with this view, fine ſoft flannel ſhould be preferred either to linen or cotton: for being more elaſtic, it more readily yields to any ſwelling with which the limb may be attacked.

The late Dr. Monro was the firſt who gave any accurate directions for treating a rupture of the large tendons; and he has probably done it with the more preciſion, from having himſelf experienced the effects of this misfortune in the tendo Achillis. As the method which he points out, and the inſtruments which he recommends, are very ſimple and judicious, and as they have in various inſtances been found to anſwer very completely, a deſcription of them will be conſidered as a proper addition to this article.

The different inſtruments uſed by Dr. Monro, with the ſeveral parts of each of them, are repreſented in Plate LXVIII.

Fig. 9. is a foot ſock, or ſlipper, A, of double quilted ticken; from the heel of which, B, the quilted ſtrap, D, is of ſuch a length as to reach above the calf of the leg.

Fig. 1. A ſtrong quilted calf piece, E, with pyeholes, FF, on each ſide, through which a lace, fig. 2. is to be paſſed, and with a buckle, G, ſo placed on its back part, that when the lacing is on the outſide of the leg, the buckle will be in the middle of the lower part. Two rows of pye holes are here repreſented, one on each ſide; either of which may be uſed according to the ſize of the leg.

In Dr. Monro's caſe, the foot and leg were firſt wrapped in ſoft flannel ſmoaked with fumes of benzoin, when he put on, as in fig. 3. the foot ſock, A, and calf piece, E; and bringing the ſtrap, H, through the buckle, G, he could by it extend the foot, and pull down the calf to what degree might be judged proper, and there it was ſecured with the buckle.

This bandage anſwered the intention perfectly well; and it was wore night and day. It ſhould be drawn tighter during ſleep, and relaxed when the patient is awake and on his guard: during which the foot ſhould be placed upon a ſtool, as at I; and the calf piece ſhould be frequently ſtuffed, or made eaſier by looſening the lace, ſo as to prevent the foot from ſwelling, which is apt to happen if this be omitted. To prevent the toes from becoming uneaſy, the foot ſock ſhould be left open at the end, K.

During the firſt fortnight the Doctor made no motion nor effort with his foot, but was carried in a chair, PLATE LXVIII.

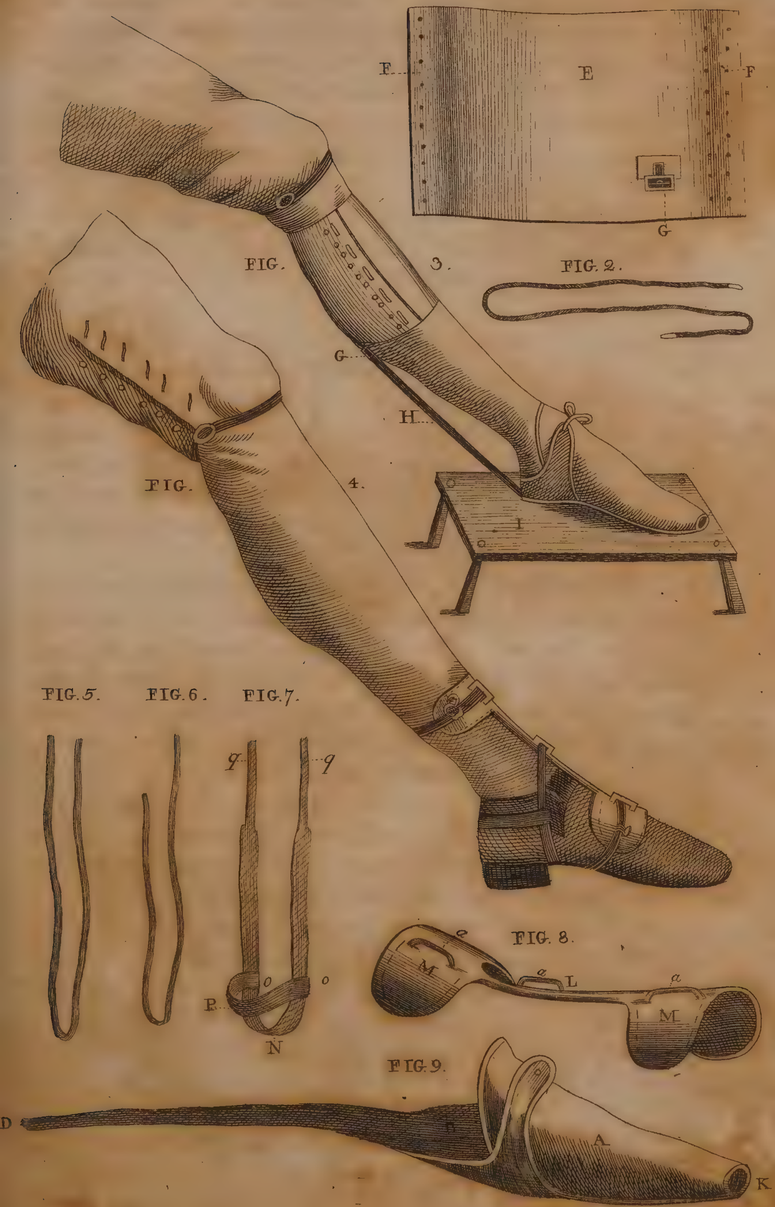


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

FIG. 8.

FIG. 9.

running on caſtors, from one part of his houſe to another: After this he began to move the foot backwards and forwards, ſo gently as not to give pain. In a gradual manner theſe motions were increaſed; the extenſion of the leg and flexion of the foot were always ſtopped on their producing any uneaſineſs.

On beginning to walk, the affected leg, which was the left, was always put before the right, ſo that the left foot might be as well extended as poſſible. To prevent any danger from falling, a cane was uſed in the right hand.

The void between the two ends of the divided tendon became inſenſible in a few days, except that a ſoftneſs was felt there more than any where elſe; but this part turned gradually thicker and harder, till a knot was formed in it of the ſize of a middle ſized plum. At firſt this tumor was equally hard with a piece of cartilage; but it gradually became ſofter, and diminiſhed ſo much, that at laſt it was ſcarcely perceptible.

With a view to ſtrengthen the leg and foot, cold water was poured upon them, and immediately thereafter they were well rubbed. This was firſt employed ſome weeks after the accident: but no advantage being derived from it, the parts were afterwards ſtrongly rubbed twice a day with unguentum altheæ, or ſome other emollient; and this was continued till the limb could be uſed with freedom.

In about two weeks from the time of receiving the injury, the Doctor was obliged to go abroad, when he uſed a pair of ſhoes with heels two inches high, and applied the machine, which we ſhall preſently deſcribe, through the day, inſtead of the former bandage; which, however, was always put on at night for a month longer.

This new machine, fig. 8. is a piece of ſteel, the middle ſtalk of which, L, is narrow but ſtrong; the ends, MM, are thin and concave, and muſt be adapted to the convexity of the foot and fore part of the leg.

Three ſtaples, *a*, *a*, *a*, ſtand up from the fore part of the ſteel; one in the middle of each of the broad ends, and the third in the middle of the ſtalk. All the ſteel, except the ſtalk, ſhould be covered with ſoft leather, and the concavities of MM ſhould be well buffed, as the ſofter rupture bandages commonly are.

After putting on the ſhoes and ſtockings, one end of this machine was put upon the broad part of the foot, nearer the toes than the buckle of the ſhoe, and the other end was placed upon the fore part of the leg; then one ribband, or a thong of leather, fig. 5. was put round the foot, and another, fig. 6. round the leg, to paſs through the two ſtaples near the ends of the machine, and there ſecured with ſtraps or buckles, but without being drawn tight. A third ſtrap or ribband, fig. 7. with its middle, N, applied to the hollow of the foot, immediately before the heel, had its ends paſſed on each ſide of the foot through a nooſe, *o o*, of a fourth thong of leather, P, that came round the quarter heel of the ſhoe, to be afterwards put through the middle ſtaple; where, after theſe ends, *q q*, were drawn as tight as was thought convenient for extending the foot, they were ſecured with the buckle or with knots. See the application of this machine in fig. 4.

This was continued for the ſpace of five months; but thoſe who may find it inconvenient, might uſe inſtead of it a thong of leather, ſewed at one end to the upper and middle part of the quarter heel of the ſhoe, and faſtened at the other end to a garter or ſtrap put above the calf of the leg. The high heeled ſhoes were continued for a conſiderable time: two years elapſed before they were thrown aſide; by which means, and by treating the injured limb during all that period with great caution, a very complete cure was obtained; while others, who have not been ſo attentive to the management of matters of this kind, have not been ſo fortunate; ſome of them having the tendon ruptured a ſecond, or even a third time, and others remaining ſtiff and lame for a great length of time.

SECTION VIII.

Of Wounds in the Ligaments.

BY Ligaments, we underſtand thoſe flexible bodies which ſerve to cover the different articulations, and by which many of the bones are firmly tied to one another. The bones of the pelvis are united by ſtrong ligaments; and we know, that ſeveral other bones are chiefly connected by the ſame means. But as all theſe ligaments lie deep, they are not much expoſed to the effects of external violence; and the ſame cauſe puts it out of our power to apply any particular treatment for injuries which may accidentally be done to them. Our obſervations at preſent are therefore chiefly applicable to wounds of the ligaments of joints, commonly termed Capſular Ligaments.

As the ligaments are not ſo plentifully ſupplied with nerves as ſome other parts of the body, ſeveral anatomiſts have been induced to believe that they are not poſſeſſed of ſenſibility; by which we might be led to conclude, that injuries done to them would not probably require much attention: But although Nature, for obvious reaſons, has not made the ligaments highly ſenſible; and although in a healthy ſtate they will bear much fatigue without ſuffering ſo much as other parts of the body; yet the fact is undoubted, that they are rendered extremely ſenſible by diſeaſe; and that wounds inflicted on them are frequently productive of very alarming conſequences. We have often indeed known the ligaments of joints much injured, nay violently lacerated, by the heads of the bones which they ſurround being puſhed through them, as well as by other cauſes, without any bad effect being experienced from it; and in ſome caſes the wounds have healed as eaſily as if the ligaments had not been affected. Theſe, however, are rare occurrences, and are by no means to be depended upon: for in a great proportion of caſes where joints are wounded, the ſymptoms which enſue are ſevere and hazardous. Affections of this kind, however, are very deceiving: for in general nothing alarming appears at firſt, nor for ſeveral days after the accident; and when the patient is treated with care and attention, I have known a week paſs over before any other ſymptom has been obſerved than what uſually takes place in the moſt ſimple wounds. But, at length, the patient begins to feel an uneaſy ſenſation of ſtiffneſs over the affected joint, which by degrees turns more ſevere; when the parts become ſwelled, tenſe, and ſomewhat inflamed. In this ſituation the pain is in general ſo very ſevere, that the patient cannot allow the joint to be touched: He complains of a tightneſs round the whole, as if it was firmly tied or girded; and the inflammation, which at firſt was confined to the joint itſelf, is now apt to ſpread over the whole limb.

If the wound or laceration in the capſular ligament is large, the ſynovia is often diſcharged in conſiderable quantities at firſt; but the ſwelling induced by the inflammation gradually puts a ſtop to it, till at laſt the wound becomes dry and ſloughy. In the courſe of a few days, however, extenſive ſuppurations begin to form over the joint; and on theſe being laid open, large quantities of pus are diſcharged, together with ſynovia. By this the tenſion and girding pain are immediately removed, and the patient experiences much relief; but ſucceſſive ſuppurations often take place, which from time to time excite a renewal of all the ſymptoms, and by which the patient's health is at laſt very apt to be much injured.

When wounds in the ligaments do not heal quickly, and almoſt without the formation of matter, this is in general the manner in which they terminate; at leaſt it is the caſe in the larger joints, and it is in theſe chiefly that they ever prove alarming.

From this hiſtory of the riſe and progreſs of the ſymptoms, ſome advantage may be derived in conducting the cure. From this it is evident, that it is not merely the injury done to the ligament which we have to dread; but a ſecondary train of ſymptoms, which are very apt to reſult from it. Although none of the lining membranes of cavities, which are naturally ſhut up from the air, ſeem to be endowed with much ſenſibility, it ſeems to be a very common effect of air finding acceſs to them to give them an exquiſite degree of it. Of this we have frequent proofs in wounds which penetrate the cavities of the thorax and abdomen; and it is evidently to this cauſe that we are to attribute thoſe conſequences which reſult from wounds in the capſular ligaments of joints.

This points out a very important circumſtance in the treatment of ſuch wounds; namely, the prevention, as far as is in our power, of air finding acceſs to theſe cavities. In large lacerated wounds this will, for the moſt part, be impracticable; but in common inciſed wounds, it may often be very completely effected.

It ought never to be attempted, till we are certain that any extraneous body that may have been carried in is extracted. This being accompliſhed, we may very commonly cover the wound in the capſular ligament entirely, by pulling the ſkin ſo far over it, that the wound in the one may not correſpond with that in the other; and as the ſkin about the joints is ſufficiently lax to admit of this, it may always be eaſily done. We are now to fix the ſkin in ſuch a manner that it may not retract, either by ſutures or adheſive plaſters: but in general the latter will prove ſufficient, if they be aſſiſted by the application of a proper bandage; and they are preferable to ſutures, which in this ſituation are apt to excite inflammation. After the plaſters are applied, the ſkin and cellular ſubſtance ſhould be ſupported in their ſituation by paſſing a flannel roller ſpirally round the joint, ſo as to produce an equal degree of compreſſion over the whole of it, of a tightneſs ſufficient for ſupporting the parts to which it is applied without interrupting the circulation. The patient ſhould be in bed while the dreſſings are applied, ſo that they may not afterwards be liable to be moved; and the limb ſhould be put upon a pillow, and placed in ſuch a ſituation as admits of the ſkin and other teguments being moſt completely relaxed, which will be found to be different in different parts even of the ſame joint. Thus, in treating a wound of this kind in the anterior part of the knee, the leg ſhould be kept extended during the whole progreſs of the cure; for in this ſituation the ſkin which covers the fore part of the joint is moſt effectually relaxed; while, for a ſimilar reaſon, in penetrating wounds entering from the ham, the leg ſhould be kept bent.

In the mean time, in order to prevent the acceſſion of inflammation, the patient ſhould be put upon a low diet; his bowels ſhould be kept lax; a moderate perſpiration ſhould be excited; and he ſhould loſe a quantity of blood ſuited to his age and ſtrength.

By treating wounds of the joints with this ſtrict attention, I have known many of them terminate eaſily, which might otherwiſe have been productive of much diſtreſs: But when theſe means do not prove effectual, or when they have been too long neglected, ſo as that the application of them is no longer admiſſible, and which will always be the caſe when inflammation has taken place, other remedies muſt of courſe be employed.

In this ſituation, our principal object is to remove the inflammation; and if it be not ſpeedily accompliſhed, it will in all probability ſpread over the whole joint, when it very commonly terminates in extenſive ſuppurations. Every practitioner will know, that ſuch an occurrence is neceſſarily attended with much hazard; ſo that nothing ſhould be omitted by which it can probably be prevented. The moſt effectual remedy which I have ever employed, is local blood letting;

ting; but, in order to prove uſeful, it muſt be carried to a conſiderable length. In ſtrong robuſt patients, eighteen or twenty leeches ſhould be applied as near to the part affected as they will bite; to be repeated daily as long as the continuance of the inflammation may render it neceſſary. Any of the ſimple ointments may be applied to the wound itſelf; but one of the beſt applications to the joint is the ſteams of warm vinegar, which have often appeared to prove uſeful in preventing the formation of matter. And as the pain in wounds of the joints is in general ſevere, large doſes of opiates muſt be given to allay it. In a few caſes I have known the pain much relieved by the external application of a ſtrong decoction of white popy heads by way of fomentation: but for the moſt part, nothing proves effectual but the internal uſe of opium.

By due attention to theſe means they will commonly prove effectual, if they have not been either too long neglected or too ſparingly adminiſtered. From either of theſe cauſes, however; from the violence of the injury; or from ſome conſtitutional affection; the inflammation will, in ſome caſes, ſtill proceed to increaſe; and, notwithſtanding all our endeavours, will at laſt terminate in very large collections of matter, which will be partly within the capſular ligament of the joint, partly in the ſubſtance of the ligament itſelf, and in part it will be found to have ſpread through the cellular ſubſtance of the contiguous parts. In ſuch circumſtances, all that art can do is to give free vent to any matter that may form; which can only be done by making an opening in the moſt depending part of the collections as ſoon as the exiſtence of pus is aſcertained. In this manner, and by proper uſe of emollient poultices and fomentations whenever a new collection appears to be forming, we will ſometimes be able to ſave limbs, which otherwiſe it would be neceſſary to amputate: But whoever has had experience in this branch of practice will know, that when wounds in any of the larger joints terminate in ſuppuration within the capſular ligaments, that the riſk attending them is great; and that we can never, even under the beſt management, have any dependence on their terminating favourably. The principal reaſon, as we have already obſerved, of their continuing obſtinate, is the inflammation becoming violent; which, when not obviated by the means we have adviſed, is apt to produce ſuch large collections of matter; and one abſceſs is ſo apt to ſucceed to another, that the patient is at laſt exhauſted, when we are often under the neceſſity of removing the limb in order to ſave his life. In ſuch circumſtances, indeed, there is no room to heſitate; for when the ſtrength is much impaired by the frequent formation of abſceſſes, if the ſame diſpoſition continues, and eſpecially if any degree of hectic fever has taken place, the riſk attending any attempt to ſave the limb will now be conſiderable, while the chance of ſucceeding will be ſo ſmall, that it ſhould never be adviſed.

But although I am decidedly of opinion, in circumſtances ſuch as we are conſidering, that it is the ſafeſt courſe to amputate the limb; yet I by no means agree with thoſe, who ſay, that almoſt every caſe of a wounded joint requires the ſame remedy. By many it has been aſſerted, that wounds in any of the larger joints almoſt univerſally terminate ſo unfavourably, that, in order to ſave much pain and trouble, as well as riſk to the patient, it would be the moſt adviſeable practice to amputate immediately after the accident, before there could be any chance of inflammation taking place. I am convinced, however, that this opinion is founded in error; and my reaſons for it are theſe:

Although it will not often happen that complete cures are obtained where the capſular ligaments of any of the larger joints are extenſively wounded, yet in ſome caſes it is otherwiſe. Of this I have met with different inſtances: And although ſuch injuries will not often be ſo effectually cured as to prevent a conſiderable degree of ſtiffneſs and immobility in the joints in which they are ſeated; yet even a complete anchyloſis is an inconvenience to which a patient ſhould ſubmit, rather than to the pain and hazard which uniformly attend the amputation of any of the extremities.

As it muſt be admitted, however, that the proportion of limbs which are ſaved by this practice, is extremely ſmall when the injury done to the capſular ligaments of joints are extenſive, this argument would not deſerve our attention, if the delays which it occaſions were to be attended with any additional hazard, or if it ſhould preclude amputation, if at any future period of the ſore it might be judged adviſeable. This indeed, has been alleged by practitioners: but there is much cauſe to ſuſpect that they are wrong; for many who have been accuſtomed to amputate in the late ſtages of ſuch ſores, have had more ſucceſs than generally attends the practice when adviſed immediately after the injury is inflicted. And this, in the courſe of my experience, has been ſo uniformly the caſe, that ſcarcely any have died who were not previouſly ſo very much reduced as to render their chance of recovering very ſmall indeed; a ſituation which we have it always in our power to guard againſt, by adviſing the meaſure before matters are ſo far advanced.

Where the capſular ligament of a joint has not only been wounded, but much lacerated and contuſed, it may in a few caſes be proper to adviſe immediate amputation. But ſuch inſtances are extremely rare: ſo much ſo indeed, that I have never met with any, excepting where the ends of bones have been perhaps much broke, and even ſplintered at the ſame time. Where this has not been the caſe, I have uniformly been in the practice of attempting to ſave the limb; and as in ſeveral inſtances I have ſucceeded, without adding to the riſk of the patient where the trials have failed, I ſhall certainly think it right to continue it.

SECTION IX.

Of Wounds in the Face.

IN the ſecond volume of this Work, we entered into a full conſideration of wounds of the head, which either primarily or eventually may affect the brain: and in it, and in this volume, we treated of the Diſeaſes of the Eyes, Noſe, and Mouth; we ſhall now thereſore refer to what was then ſaid upon theſe parts of our ſubject.

In the treatment of wounds in any part of the face, one important object is to prevent deformity. This is indeed, an object in every part of the body; but in the face it is ſo eſſential, that the ſlighteſt injuries done to it require particular attention.

As every cicatrix produces ſome degree of deformity, we ſhould endeavour in every wound of the face, to have the divided parts laid as exactly and neatly together as poſſible, and to retain them by thoſe means which will be productive of the leaſt mark. In all ſuperficial wounds of the face, as well as in thoſe which run deep, when of a longitudinal direction with reſpect to the fibres of the injured part, we ſhould truſt to adheſive plaſters alone for retaining them. But wherever the edges of a wound retract much from each other, as we will not be able in any other manner to retain them, ſutures ought without heſitation to be employed; and of theſe the twiſted ſuture, deſcribed in Chap. I. Sect. V. Vol. I. ought in general to be preferred; for it prevents retraction with more certainty than the others, at the ſame time that it is not productive of more pain or uneaſineſs. In this manner it is more eſpecially neceſſary to treat all wounds of the lips, which cannot indeed in any other way be prevented from leaving much deformity; we ſhall refer, however, to Chapter XXIX. Section I. for what was farther ſaid upon this point, when treating of the operation for the Hare Lip.

Wounds in the cheeks are apt to penetrate the ſalivary ducts leading from the parotid glands; and as this is frequently productive of much inconvenience, by the divided duct continuing to pour out the ſaliva long after the reſt of the wound is healed, it becomes an important object in many inſtances to accompliſh a cure. But as we entered into a particular conſideration of this point in Chap. XXX. Sect. XIV. we muſt now refer to what was then ſaid upon it.

In the forehead, wounds are ſometimes attended with hemorrhagies, which prove troubleſome from our not being able in the uſual manner to apply ligatures upon the arteries from whence the blood is diſcharged, owing to their running in a groove of bone; which is the caſe with a ſmall branch which paſſes out on each ſide from the internal carotid immediately above the eye brows. In all ſuch caſes, we ſhould, in the firſt place, employ ſponge, agaric, or any mild aſtringent, along with gentle compreſſion; and when this fails, we may endeavour to pull out the bleeding veſſel by means of the tenaculum, and in this manner may tie it with a ligature. I once ſucceeded in this way with perfect eaſe, when every other method had been tried in vain.

It may ſometimes happen, however, even that this will fail. In ſuch caſes, when the hemorrhagy continues ſo profuſe as to endanger the patient, it may be proper even to remove that portion of the ſkull in which the veſſel is incaſed; or, in the hands of a nice operator, the intention may be anſwered by taking away the outer table of the ſkull only: for, in ſome caſes, theſe arteries run for a conſiderable ſpace between the two lamina of the bone; and in ſuch inſtances our object may be accompliſhed by the removal of one of them; and thus the riſk of expoſing the brain will be avoided.

SECTION X.

Of Wounds in the Trachea and Oeſophagus.

IT is neceſſary in ſome caſes to make openings into the treachea and oeſophagus, for allowing food and air to paſs to the ſtomach and lungs when theſe paſſages are obſtructed. We muſt refer, however, for the method of effecting this, to Chapters XXIII. and XXIV. where theſe operations are particularly deſcribed: At preſent we are to conſider the method of treating wounds in the trachea and oeſophagus, inflicted in ſome caſes by accident, but more frequently by deſign; as often happens where ſuicide is attempted.

The trachea is ſeldom divided longitudinally. Tranſverſe wounds running between two of the cartilages, of which it is compoſed, are more frequent. In ſome caſes theſe wounds are ſuperficial, and only penetrate the anterior part of the tube; in others, they run ſo deep as to divide it entirely.

In all longitudinal wounds of the trachea, a cure may be obtained by the uſe of adheſive plaſters alone: The lips of the wound will be eaſily brought together; and as the retraction will never be conſiderable, a proper application of adheſive plaſter will prove ſufficient for retaining them. In ſuch caſes, therefore, they ſhould be preferred to ſutures; and bandages are here inadmiſſible, as they cannot be applied with ſuch tightneſs as to have any effect upon the wound, without compreſſing the trachea ſo much as to impede reſpiration.

Even in ſlight tranſverſe wounds of this part, a cure may often be effected with adheſive plaſters; and this eſpecially, if they be aſſiſted by a proper poſture of the head, which in every wound of this nature ſhould be kept as much as poſſible bent down upon the breaſt. Indeed, if this be not duly attended to, it will often be impoſſible to produce a right reunion of the divided parts either with plaſters or any other means: It ought not therefore to be left in the power of the patient. The head ſhould be fixed with a bandage; and the moſt ſimple, as well as the moſt effectual, method of doing it, is by putting a common night cap upon the head, and a piece of broad tape or ribbon being ſewed on each ſide of it above the ear, it may now be pulled down and fixed as low as is neceſſary, by tying the tapes to a circular roller put round the cheſt. In this ſituation the head ſhould be kept for ſeveral days, till there is reaſon to imagine that the parts are firmly united.

But in tranſverſe wounds of the trachea, which penetrate deep, we ſhould not truſt to adheſive plaſters; the interrupted ſuture made with broad ligatures will anſwer better. I am doubtful, however, if the ligatures ſhould ever be paſſed into the trachea, as ſome have adviſed; for the irritation and cough which they excite is very apt to do miſchief by tearing aſunder the very parts they are meant to unite; at leaſt this has been the caſe in two inſtances where I have known this method practiſed. A troubleſome cough was induced in each of them; the ſtitches were tore out; and much perplexity was thus given both to the patient and ſurgeon.

Inſtead of paſſing the ligatures round any of the cartilages of the trachea, and thus carrying them into the cavity of the tube, I have in different inſtances ſucceeded merely by external ſtitches done in the following manner: The ſurgeon being provided with a number of needles and ligatures according to the extent of the wound, and the patient being properly placed, one of the needles ſhould be inſerted at one ſide of the wound, and being paſſed ſlowly up for the ſpace of an inch between the trachea and ſkin, ſo as to include all the cellular ſubſtance and muſcular fibres which lie between them; it is now to be puſhed out along with one end of the ligature; and the other extremity of the thread being likewiſe armed with a needle, muſt in like manner be paſſed through the teguments of the oppoſite ſide. None of the ligatures ſhould be tied till they are all introduced; when this is done, and the divided edges of the cut are properly ſupported by an aſſiſtant, they ſhould be ſecured with running knots, ſo as to admit of their being eaſily untied if this ſhould be found neceſſary; adheſive plaſters ſhould be applied over the whole; and the head ſhould be firmly ſecured in the manner we have mentioned.

In paſſing the ligatures, care ſhould be taken to run the needles as cloſe to the cartilages of the trachea as poſſible, ſo as to include whatever may afford them any ſupport: For which purpoſe flat needles ſhould be employed, with a ſlight degree of curvature, as is repreſented in Plate II. fig. 5.

Whether or not this method will ſucceed where the trachea is completely divided, I cannot as yet determine, having had no opportunity in ſuch a caſe of putting it in practice: but as it has ſucceeded where all the anterior part of the tube was divided, there is reaſon to imagine that it would not often fail. At any rate, it ſhould always be propoſed in the firſt place; for even when it does not ſucceed, we are not prevented from employing other means of relief. In ſuch inſtances we are reduced to the neceſſity of paſſing the ligatures round one or more of the cartilages of the trachea, which, with a curved needle, may be eaſily done: Care ſhould be taken, however, to enter both ends of the ligature from the inſide of the trachea, when by puſhing the point of the needle outward, all riſk of doing miſchief will be avoided.

To give the practice as much chance as poſſible of ſucceeding, there ſhould be as many ligatures introduced as may ſeem in any degree neceſſary for retaining the divided ends of the trachea together: In general, three ſtitches will be found ſufficient; one in the middle of the prominent part of the trachea, and another

nother on each ſide, towards the extremities of the cartilaginous rings.

Wounds of the oeſophagus are to be managed nearly in the ſame manner with wounds in the trachea: but they are more dangerous, on account of the difficulty of reaching the oeſophagus from its deep ſituation; from the under part of it, when entirely ſeparated from the reſt, being apt to fall altogether within the ſternum; and from the difficulty of ſupporting the patient with proper nouriſhment.

Theſe wounds are likewiſe to be conſidered as dangerous, from their vicinity to large arteries and nerves. If the recurrent nerves are divided, the voice may be much impaired; and if any of the large branches of the carotid arteries are wounded, the patient may die from loſs of blood before aſſiſtance is procured.

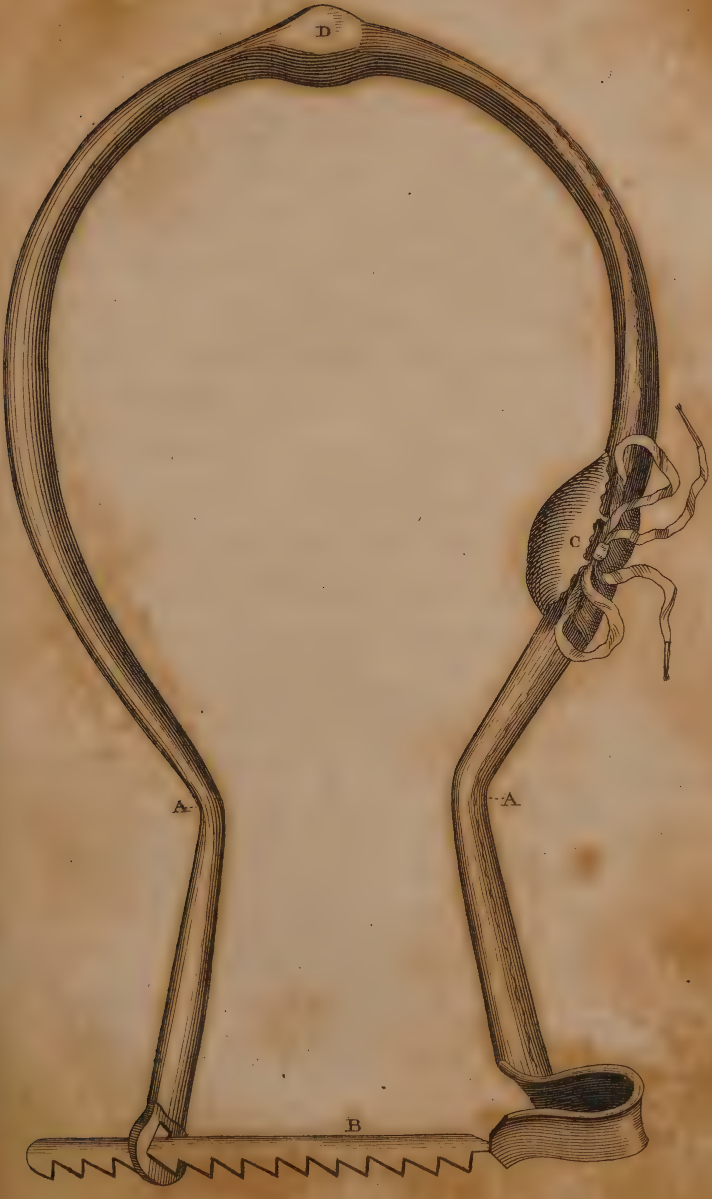
In wounds of the trachea and oeſophagus, our firſt object ſhould be to put a ſtop to the hemorrhagy, not only to prevent the loſs of blood, but to obviate the cough and ſickneſs, which greatly aggravate the injury, and which are the conſequence of blood finding acceſs to the ſtomach and lungs. Every veſſel therefore, that pours out blood, whether artery or vein, ſhould be immediately tied with a ligature. When the wound is not extenſive, but is confined nearly to the boundaries of the trachea and oeſophagus, the artery which goes to the thyroid gland will probably be the largeſt veſſel that is cut; for it is commonly in this ſituation, immediately below the thyroid cartilage, that attempts are made upon the throat. But in wounds of greater extent, the jugular veins, and even the carotid arteries, are ſometimes divided. For the moſt part, a wound in either of theſe arteries proves immediately fatal; but when one of the carotids is only partially hurt, there may be a poſſibility of ſaving the patient by ſecuring the bleeding veſſel with a ligature both above and below the cut: at leaſt, it ſhould always be attempted; and it is probable when one artery only is cut, that the attempt would ſucceed. There is no reaſon to doubt of its proving ſucceſsful in wounds of the jugular veins: but where theſe veins are only wounded, without being cut entirely acroſs, we may with propriety endeavour to effect a cure by compreſſion. When ſlight compreſſion only is neceſſary, it may be accompliſhed by a circular roller put round the neck; but when any conſiderable degree of preſſure is required, as this cannot be employed without impeding reſpiration, we are under the neceſſity of uſing a machine for protecting the trachea. In Plate LXIX. an inſtrument is delineated, which anſwers this purpoſe very effectually.

As ſoon as the hemorrhagy is ſtopped, we ſhould proceed to unite thoſe parts of the oeſophagus which have been divided; and in doing it, if the wound be not very extenſive, it will be of much importance, both to the operator and patient, to have it enlarged in every direction that may be neceſſary for bringing the injured parts eaſily and completely into view, by which the ligatures will be introduced with much more exactneſs than can otherwiſe be done. In paſſing the threads, the needles ſhould be entered from within, and puſhed outwards, in the manner we directed for wounds of the trachea: and in both caſes, the ends of them ſhould be left of a ſufficient length to admit of their hanging freely out of the external wound in the teguments. The interrupted ſuture appears to be beſt adapted for this operation.

In longitudinal wounds of the oeſophagus, there is reaſon to imagine, from the reſult of different caſes, that cures might frequently be accompliſhed without the aſſiſtance of ligatures. But in tranſverſe wounds of this part, it is the ſafeſt practice to employ one or more ſtitches, according to the extent of the injury, by which the food will be prevented from eſcaping during the cure, and by which a reunion of the divided parts will be more readily accompliſhed.

SECTION

PLATE LXIX.



SECTION XI.

Of Wounds in the Thorax.

§ 1. *General Remarks on Wounds in the Thorax.*

TO the conſideration of wounds of the Thorax, it will be proper to premiſe a ſhort account of the boundaries of this cavity and of the viſcera which it contains.

The Thorax is an extenſive cavity, of an irregular oval figure, bounded anteriorly by the ſternum, laterally by the ribs, behind by the vertebræ of the back, above by the clavicles, and below by the diaphragm, a firm muſcular expanſion, which ſerves as a partition between it and the cavity of the abdomen.

The diaphragm does not paſs in a direct line from one ſide of the cheſt to the other; on the contrary, it falls conſiderably lower in ſome parts than in others, by which the extent of this cavity is in different parts very unequal. On cutting the thorax directly acroſs about the middle of the ſternum, and looking down upon the diaphragm, we find it round and prominent about the middle, with its edges ſtretching down to its ſeveral attachments. In its higheſt and moſt anterior point, it is fixed to the cartilago enſiformis; from whence it deſcends obliquely, and is attached as it goes along to the ſeventh, eighth, and all the inferior ribs: while, behind, it is fixed to the upper vertebræ of the loins. From this it is evident, that the back part of the thorax is much more deep and capacious than the anterior part of it: a point with which practitioners ſhould be very exactly acquainted, otherwiſe their ideas of wounds in theſe parts will often be very erroneous. Thus, without this information, we would be apt to imagine that no injury would be done to the lungs by wounds running directly acroſs the body, after entering any part of the cavity of the abdomen: whereas it is certain, that no inſtrument can paſs in this direction even at the diſtance of ſeveral inches beneath the upper part of the abdomen, without penetrating the cavity of the thorax; and, for the ſame reaſon, all wounds which paſs directly acroſs the body from the inferior and back part of the thorax, muſt neceſſarily paſs through the abdomen.

The whole cavity of the thorax is lined by a firm membrane termed the Pleura, which adheres every where to the ſternum, to the ribs, intercoſtal muſcles, and diaphragm. Each ſide of the cheſt has a diſtinct pleura; which uniting together near the middle of the breaſt, and running tranſverſely from the ſternum to the vertebræ, form two cavities which have no communication with each other. This membranous partition is termed the Mediaſtinum. It adheres firmly, as one membrane, to the ſternum through its whole length; but the two pluræ recede from each other near to the vertebræ, to admit of a paſſage for the aorta and oeſophagus. The heart, incloſed in the pericardium, occupies a conſiderable part of the left cavity of the thorax: the reſt of this diviſion, with all the right ſide of the cheſt, is chiefly filled with the lungs. The only other parts lodged in the thorax are, the aorta, oeſophagus, the thoracic duct, thymus, and large blood veſſels about the heart. In a ſtate of health, the lungs do not adhere to the pleura; but it often happens, after inflammatory affections of theſe parts, that very firm and extenſive adheſions take place between them.

The thorax is expoſed to all the variety of wounds; but the chief diſtinction we have to attend to, is that which takes place from their degree of depth. Superficial wounds, which do not run deeper than the common teguments, if they are rightly treated, will ſeldom be productive of any important conſequences; while even the ſlighteſt injury which penetrates the cheſt will, in ſome inſtances, be attended with the moſt alarming

larming ſymptoms; and theſe again will be of a more dangerous nature when any of the viſcera lodged in the thorax are wounded.

Wounds of the thorax may therefore be divided into three kinds: Thoſe which affect the common teguments only; ſuch as merely penetrate the cavity without doing any further injury; and thoſe by which ſome of the viſcera are likewiſe hurt.

Our firſt object in wounds of this kind is, to diſcover whether they have penetrated the cavity of the cheſt or not; which in general we may do by attending to the following circumſtances: By the patient being put into that ſituation in which the wound was inflicted, and in this ſtate making a particular examination with the fingers, or probe, of the direction and depth of the wound; by the form of the inſtrument, and the length to which it ſeemed to be puſhed; by any mild liquid which may be injected returning immediately or lodging in the wound; by air being diſcharged in conſiderable quantities during reſpiration; by an emphyſematous ſwelling appearing over the contiguous teguments; by the quantity of blood diſcharged from the wound being conſiderable or otherwiſe; by the appearance of the blood; by blood being diſcharged from the mouth; and by the ſtate of the pulſe and reſpiration.

Each of theſe circumſtances we ſhall conſider in the order they are mentioned.

It is obvious that it is of importance to pay attention to the poſture of the patient during the examination of every wound; but it is in none more ſo than in wounds of the thorax, where, from the variety of muſcles which may be injured, and from the mobility of the ribs, wounds may in one poſture appear to be quite ſuperficial, which in others are found to penetrate to a great depth; for if any part of a rib, of a muſcle, or even of the cellular ſubſtance, be forced by the poſture of the patient into the courſe of a wound, neither the finger, probe, nor injections, will paſs with that eaſe

which

which the free examination of ſuch injuries requires. In all ſuch caſes, therefore, before we proceed to examine the direction and depth of the wound, the patient ſhould be placed as nearly as poſſible in the poſture he was in at the time of receiving it.

In ſome caſes, the opening is ſo large, that we diſtinguiſh with the eye whether a wound has penetrated to the depth of the cavity or not; or we introduce one of the fingers, which is better than any probe when it can be paſſed forward without lacerating the contiguous parts: But when the opening is too ſmall to admit of this, we are under the neceſſity of uſing a probe; and the beſt ſubſtance for this purpoſe is a common bougie. When we mean by probing a ſore to diſcover whether there is any extraneous body lodged or not, or whether the bones beneath are carious or in a ſound ſtate, a metallic probe is to be preferred: but for examining the depth and direction of a wound, nothing anſwers ſo well as a firm and tolerably thick bougie; which neither gives ſo much pain to the patient, nor is it ſo apt to be puſhed beyond the depth of the wound into the contiguous ſoft parts, as the common ſmall probe when uſed with freedom. This will not often indeed occur with practitioners of experience, as they will not only uſe this inſtrument in every caſe with caution, but will be ſenſible that it is often unneceſſarily employed: For even in wounds of the thorax, we ſhould not ſearch for their depth with too much anxiety; as, by doing ſo, more harm may be done than could be compenſated by any advantage to be derived from the diſcovery. It is highly proper to examine, in a cautious way, into the direction and depth of ſuch wounds; but the younger part of the profeſſion ſhould know, that much harm has been done by reſearches of this kind being carried too far: and they ſhould likewiſe know, that it is perhaps of more importance to be acquainted with the direction of an external punctured wound, which does not run deeper than the cellular ſubſtance above the ribs, or perhaps to the intercoſtal muſcles, than to know, by means of the probe, whether a wound reaches to the cavity of the cheſt or not: for even where we find, in the moſt evident manner, that a wound goes to the depth of this cavity, if no bad ſymptoms occur, little or no advantage is obtained from the diſcovery; and where ſuch ſymptoms take place as are known to proceed from a penetrating wound, and of which we ſhall afterwards treat, we are thus rendered equally certain of the nature of the caſe as if a probe had paſſed eaſily into the thorax.

Some advantage may be procured in inquiries of this kind, from our attending to the ſize and figure of the inſtrument; the direction it ſeemed to take; and the depth to which it was puſhed: Theſe are points of which we cannot always receive exact information; but it is ſometimes otherwiſe, particularly in duels, where a ſurgeon is frequently attending, and where the byſtanders are often ſo much intereſted as to be able to give diſtinct intelligence upon this and every other point of importance.

When we are rendered certain, by either of theſe modes of inquiry, of the depth of a wound, it would be unneceſſary as well as improper to carry our reſearches farther: but when the point remains in doubt, it may be ſometimes determined by throwing in injections of any mild liquid. If the liquor returns immediately, there will be reaſon to conclude that the wound is ſuperficial, or at leaſt that it does not paſs into the thorax; but when it lodges either altogether, or in any conſiderable part, without raiſing any outward tumefaction, there will be no cauſe to doubt of its having reached the cavity. In throwing in liquids for this purpoſe, either the common ſyringe, Plate LXIV. fig. 4. may be employed, or a bag of the elaſtic gum, mounted with a pipe as in Plate XXIX. fig. 3. but it ſhould never be done with much force, as in this manner parts might be torn aſunder which were not previouſly hurt; and the mildeſt liquor only ſhould be uſed, as it might prove dangerous to apply any thing poſſeſſed of ſtimulating powers to the ſurface of an irritable part. Honey and water are commonly uſed for this purpoſe; but warm water alone is leſs irritating, and ſhould therefore be preferred.

When air is diſcharged by the wound during inſpiration there will be cauſe to ſuſpect that the lungs are wounded. But although this is uſually conſidered as one of the moſt certain proofs of a wound having penetrated the cheſt, yet it is proper to remark, that it is far from being deciſive. Wherever the lungs adhere to the pleura, a wound may penetrate to a conſiderable depth; nay, it may paſs entirely acroſs the body, without entering what is properly termed the Cavity of the Cheſt; and we know that air is frequently diſcharged at wounds in the thorax where there is no reaſon to ſuſpect that the lungs are hurt; for when no adheſions take place between the pleura and lungs, the external air, if it gets acceſs by a penetrating wound, will paſs between them, and will neceſſarily be forced out at every inſpiration; a circumſtance which invalidates the certainty of this teſt. In judging, therefore, of the weight which is due to it, we ſhould, in the firſt place, cauſe the patient to make ſeveral full inſpirations, in order to diſcharge any of the external air that may be collected; and at the end of each, the contiguous ſkin ſhould be ſo drawn over the wound, as to prevent any more from finding acceſs. In this manner the whole will ſoon be evacuated; when, if we ſtill find that air ruſhes out during inſpiration, we may with certainty conclude that the lungs are injured.

Emphyſematous ſwellings ſometimes appear in conſequence of wounds of the thorax, by the air from the lungs finding acceſs to the ſurrounding cellular membrane. This, however, will ſeldom happen in extenſive wounds; as in theſe the air from the lungs will readily be diſcharged outwardly: but it is by no means unfrequent in punctured wounds, eſpecially in ſuch as have an oblique direction. It is obvious, however, that although this is a certain proof of the lungs being injured, that it may ſometimes happen without any communication with the cavity of the cheſt, for the reaſon mentioned in the laſt paragraph.

When the quantity of blood diſcharged from theſe wounds is conſiderable, we may with much certainty conclude, that they have not merely paſſed into the cheſt, but that ſome of the contained viſcera are wounded; for, excepting the intercoſtal arteries, which run upon the inferior border of each rib, all the other blood veſſels of the external parts are here very ſmall: and as we can by compreſſion eaſily put a ſtop to hemorrhagies from the intercoſtal veſſels, we may in almoſt every inſtance diſcover immediately whether the blood be evacuated from the cheſt or not.

Even the appearance of blood diſcharged from theſe wounds may lead to a knowledge of their depth. It is a known fact, that blood coming directly from a wound in the lungs, has a more red, and particularly a more frothy appearance, than blood from any other part, owing probably to its being mixed with the air in the bronchiæ; ſo that when blood aſſumes this appearance, we have much cauſe to conclude that the lungs are injured.

When blood is ſpit up by the mouth immediately after a wound in the thorax, there will be no reaſon to doubt of the lungs being hurt. For although we ought not to conclude from the abſence of this ſymptom, that the lungs have not ſuffered, as they are often wounded without any blood being diſcharged by the mouth; yet we may be convinced, that ſome injury is done to them when blood is actually diſcharged from them.

In our inquiries into the nature of ſuch wounds, the ſtate of the pulſe and of reſpiration ſhould be particularly attended to. In wounds which do not penetrate deeper than the common teguments, neither the pulſe nor breathing are at firſt affected, nor do they produce any other conſequences for the firſt two or three days than wounds in any other part of the body: but wounds which go to the depth of the thoracic cavity, and more eſpecially when they affect the lungs or any other parts contained in it, may often be diſtinguiſhed by their producing an immediate effect both upon the pulſe and breathing. When the lungs are injured in a part where they adhere to the pleura, the wound may paſs to a conſiderable depth without any extravaſation taking place into the cavity of the cheſt; in which caſe no immediate effect may enſue: but when either blood or air finds acceſs to this cavity, the lungs are immediately compreſſed, by which the breathing becomes difficult, and the pulſe feeble, oppreſſed and intermitting; ſo that when theſe ſymptoms take place, we may at once give a decided opinion of the nature of the caſe.

By due attention to theſe circumſtances, we may, in almoſt every caſe of this kind, determine with much certainty whether a wound has reached the cavity of the thorax or not; and this being fixed, we are next to proceed to the method of treatment. We ſhall firſt attend to thoſe wounds which do not go deeper than the common teguments or muſcles, and ſhall afterwards treat of ſuch as penetrate deeper.

§ 2. *Of Wounds in the external Teguments of the Thorax.*

When wounds of the thorax do not go deeper than the ſkin and cellular ſubſtance they do not give any cauſe for anxiety, as they heal with the ſame eaſe, and are to be treated in the ſame way, with ſimilar wounds in other parts of the body: but when they reach the muſcular ſubſtance between the ribs, and eſpecially when they run among theſe parts for a conſiderable way like ſinuſes, there is always reaſon to fear that at laſt they may penetrate the cavity of the thorax; for when ſores in this ſituation are not in every reſpect properly treated, and if any matter that forms in them be not regularly diſcharged, it is very apt to paſs deeper and deeper, till at laſt it makes its way through the pleura itſelf. In all ſuch caſes, therefore, it ſhould be the firſt object with practitioners to give a free vent to the matter. In open inciſed wounds, all that is neceſſary is, by means of ſoft eaſy dreſſings, to preſerve their lips or edges from adhering till they fill with granulations from the bottom : but punctured wounds ſhould either be laid open through their whole extent, or a ſeton ſhould be paſſed from one end of the ſinus to the other. When they are not very extenſive, the ſhorteſt and eaſieſt method is to lay them freely open with a ſcalpel and director, and then to heal them from the bottom like inciſed wounds from any other cauſe : but when a puncture runs to any conſiderable length, the method of cure by a ſeton anſwers better. By paſſing a ſeton along the courſe of the ſinus, it is not allowed to heal outwardly till the whole be equally filled up ; and this being accompliſhed, if the cord be gradually diminiſhed, when it is at laſt removed, a moderate degree of preſſure continued upon the parts for a few days longer, will ſeldom fail to effect a cure. Some, indeed, adviſe us to attempt the cure of all ſuch ſores with preſſure alone. But although this practice will often prove ſucceſsful in other parts of the body, particularly in the extremities, where preſſure can be applied with exactneſs along the whole courſe of a ſinus, and be continued for a ſufficient length of time without riſk ; yet in wounds of the thorax, the ſame advantages are not to be expected from it : for here the conſtant motion of the ribs prevents us from applying a continued equal preſſure without impeding reſpiration in a very diſagreeable manner. When a cure is to be attempted by preſſure alone, it muſt be done with a roller paſſed firmly round the thorax, ſupported by what is termed a Scapulary, put over the ſhoulders : But when a ſeton has been previouſly uſed, any preſſure that is neceſſary may be applied with ſlips of adheſive plaſter laid along the courſe of the wound, and fixed upon the contiguous ſkin.

This method of cure, by laying the ſinuſes open, or by the inſertion of a ſeton, to thoſe not much verſant in this branch of practice, may appear to be unneceſſarily ſevere; for in many of the older writers we are told, that our object may be accompliſhed in a much more eaſy manner, namely, by keeping the external openings of the ſores pervious by the uſe of tents till they are firmly healed from the bottom. In wounds which penetrate to the cavity of the thorax, tents, eſpecially thoſe of the hollow kind, prove often uſeful; and as they may be uſed with perfect ſafety, they ſhould not be ſo generally condemned as ſome modern practitioners have affected to do. But in punctured wounds which do not go to this depth, as our great object is to avoid every riſk of the matter finding acceſs to the thorax, whatever can tend to impede the diſcharge of it, ſhould by all means be avoided. So that in ſuch caſes tents ſhould never be uſed; they would frequently do much miſchief in the manner we have mentioned; in many caſes they would fail entirely; and if they ſhould ever ſucceed, the cure would prove much more tedious, and often more painful, than the mode of treatment we have adviſed.

In every wound of any importance, it is proper to pay particular attention to the regimen of the patient; a point upon which the event of the caſe very often depends: For we frequently obſerve injuries of this kind treated in every other reſpect with propriety; and yet the practitioner fails, from the patient being allowed too much freedom in food, drink, and exerciſe. In wounds of the thorax, attention to theſe points is ſtill more neceſſary than in ſimilar affections of any other part: for as the contained parts are highly neceſſary to life, and as they are very liable to inflammation, even from injuries that do not penetrate deep, every precaution ſhould be employed that can probably tend to prevent it. Hence, for ſeveral days at leaſt, or even till there does not appear to be any farther chance of the parts becoming inflamed, the patient ſhould be kept upon a low, cooling diet; animal food and ſtrong liquors of every kind ſhould be avoided; the bowels ſhould be kept open with mild laxatives; and when the pulſe requires it, a due proportion of blood ſhould be evacuated. Reſt of body and perfect quietneſs is of much importance in theſe wounds; for they are affected by the leaſt degree of motion; even coughing, laughing, or much ſpeaking, is apt to hurt them, and ſhould therefore be as much as poſſible avoided.

§ 3. *Of Wounds which penetrate the cavity of the Thorax.*

Wounds penetrating the thorax are always to be conſidered as hazardous, and therefore merit the utmoſt attention: Even ſuch as merely penetrate the cheſt are often attended with the moſt important conſequences; but the contiguity of the lungs and other viſcera adds much to the danger. At preſent, we are to treat of ſimple penetrating wounds, not connected with any injury done to the contained parts.

It is now known, that in a ſtate of health the lungs fill the ſpaces allotted for them in the two ſides of the thorax ſo completely, that they are every where in contact with the pleura both in the ſtate of inſpiration and expiration: And it is alſo known, that great diſtreſs in breathing is induced by air, blood, or any extraneous matter being admitted between them. Now, in penetrating wounds of the thorax, excepting where the lungs morbidly adhere to the pleura, and which we do not here ſuppoſe to be the caſe, it is ſcarcely poſſible to prevent both air and blood from being admitted: The external air ruſhing in at the wound ſoon ſpreads over the whole correſponding cavity; and when the intercoſtal artery or any other blood veſſel is divided, if the external opening be not ſufficiently large, any blood that is evacuated is very apt to fall down between the pleura and lungs to the very bottom of the cheſt; by which difficulty of breathing immediately takes place, along with all the other ſymptoms which uſually attend a compreſſed ſtate of the lungs.

In Chapter XXII. we have entered into a full conſideration, not only of the ſymptoms induced by the collection of fluids in the cheſt, but of the method of relieving them by the operation of the paracenteſis: To avoid repetitions, we ſhall now refer to what was then ſaid upon this part of our ſubject, and at preſent ſhall offer a few obſervations upon the means of preventing ſuch collections as may require the aſſiſtance of that operation.

In wounds which do not penetrate to the depth of any of the viſcera, but which merely pierce the pleura, almoſt the only artery which can be cut that can afford any quantity of blood, is the intercoſtal; and as it is of a conſiderable ſize, no time ſhould be loſt in ſecuring it whenever it is found to be wounded. As it runs in a groove in the inferior edge of the rib, it is difficult to put a ligature about it; but with attention this may always be accompliſhed.

In free inciſed wounds, the bleeding orifice will be brought clearly into view; but in ſmall punctured wounds, as the artery cannot be diſtinctly ſeen, there is a neceſſity for laying the parts ſufficiently open with the ſcalpel. When the artery is thus laid bare, various means have been propoſed for ſecuring it. For the reaſon juſt mentioned, a crooked needle cannot be paſſed round it. We are therefore told by ſome, that the only method of doing it is to paſs a firm broad ligature altogether round the rib, and by means of it to tie a doſſil of lint upon the orifice in the artery: While others condemn this practice, from the injury which it muſt neceſſarily do to the pleura; for this membrane can ſcarcely be ſeparated from the rib, ſo as not to be included in the ligature; and different inſtruments have therefore been propoſed for obviating this inconveniency. The intention of all of them is to compreſs the intercoſtal artery, without hurting the pleura; but as none of them I have met with anſwer this purpoſe, I do not think it neceſſary to delineate them: thoſe who wiſh to ſee them may look into the ſecond volume of Memoirs of the Royal Academy of Surgery at Paris.

It is luckily, however, in our power to ſecure this artery in a much more ſimple manner. By dilating the wound ſufficiently, we may with a tenaculum, ſomewhat more bent at the point than uſual, draw the bleeding veſſel out of its groove, ſo as to tie it in the ordinary way; at leaſt in thin people it may be eaſily done: and where it is found either from the ribs being deeply covered with fat, or from any other cauſe, that it cannot be ſecured in this manner, it may always be done in the manner we have mentioned, by paſſing a firm broad ligature round the rib, and by means of it tying a ſmall doſſil of lint upon the bleeding artery. In this way a portion of the pleura will no doubt be included in the ligature; but it does not appear from experience, that this is productive of any thing bad; and with ſufficient caution we may always with certainty avoid the lungs. When the lungs do not adhere to the pleura, they collapſe in ſome degree immediately on the external air finding acceſs through the wound to the cavity of the cheſt. And even when they do adhere, we may eaſily ſeparate as much of them with the point of the finger as will admit of the paſſage of the ligature.

When a practitioner is called immediately, he may in this manner prevent any quantity of blood from being emptied into the thorax; and as ſoon as the hemorrhagy is ſtopped, he ſhould endeavour to expel all the air that has found acceſs by the wound to the ſurface of the lungs; for till this is accompliſhed, the breathing will remain oppreſſed, nor will the patient be able to bear the application of the neceſſary dreſſings. In the chapter above alluded to, we have mentioned different methods of expelling air from the ſurface of the lungs; but the ſimpleſt and eaſieſt is this: While the wound yet remains open, let the patient, in a ſlow gradual manner, make a full inſpiration, by which a conſiderable part of the collected air will be diſcharged. This being done, the ſkin muſt be inſtantly drawn over the ſore, ſo as to cover it completely during expiration; and if the wound be moderately opened during inſpiration, the whole quantity will thus be ſoon expelled. After which, the lips of the wound ſhould be drawn exactly together, and in this ſituation ſhould be ſecured by different ſlips of adheſive plaſter, care being taken to ſupport the whole by a proper application of the napkin and ſcapulary bandage.

In this manner wounds of the thorax will frequently heal, which, if left to themſelves, or if treated in the uſual way by allowing them to remain open, might be productive of much diſtreſs. But in ſome caſes, either from a conſiderable quantity of blood having been thrown out from the intercoſtal artery before the ligature was applied; from the oozing of blood from the ſmaller ramifications of the intercoſtal arteries; or perhaps from a ſubſequent formation of pus; oppreſſed breathing will ſupervene, notwithſtanding all that can be done to prevent it.

When this takes place as a conſequence of a wound in the cheſt, from the formation of matter, an opening ſhould be made to diſcharge it in the manner we have adviſed in the chapter on Empyema; and in this caſe the opening ſhould be made in the moſt depending part of the thorax. But when it occurs immediately after a wound, and while the blood yet remains in a fluid ſtate, we may often be able to diſcharge it at the wound itſelf: and when this can be done, it ſhould always be preferred; for we are not to imagine that the thorax can in any part be laid open without ſome riſk of harm being done by it. When ſymptoms, however, of oppreſſed breathing occur from a wound in the upper part of the thorax, as we will not be able to diſcharge the blood by it, we are under the neceſſity of making a perforation in the under part of the cheſt as ſoon as they become in any degree formidable. It is proper, however, to obſerve, that this operation ſhould never be adviſed while the ſymptoms are moderate: for we have daily inſtances of ſmall quantities, not only of blood but of other fluids, being abſorbed; and as the riſk attending a perforation in this place is probably greater than that which occurs from ſmall quantities of blood being allowed to remain, it ſhould not be attempted as long as the breathing continues tolerably free.

§ 4. *Of Wounds of the Lungs.*

We have already, in the courſe of this ſection, enumerated the ſymptoms which indicate a wound in the thorax to have penetrated the lungs. And although the danger in this caſe is greater than in wounds which merely penetrate the pleura, yet the method of cure ſuited to the one is ſo nearly the ſame with what we have adviſed for the other, that it is ſcarcely neceſſary to enlarge farther upon it.

It is proper, however, to obſerve, that as the riſk attending wounds in the lungs is conſiderable, the caution with which they are treated ſhould be proportionally great. Inſtances indeed have occurred of their healing with eaſe and ſafety; but theſe are ſo rare, that we do not heſitate in ſaying, that every injury done to them is to be conſidered as hazardous.

The danger which attends them originates, in the firſt place, from the hemorrhagy being apt to proceed farther than the ſtrength of the patient will bear; and, afterwards, from abſceſſes forming in the lungs, which are apt to terminate in pthiſical affections.

The hemorrhagy is moſt readily checked by plentiful veneſection, which in ſuch caſes ſhould at once be carried ſo far as to induce fainting; by the patient being kept in a cool apartment and at perfect reſt; by the uſe of cooling laxative medicines; and by a low regimen. Beſides reſt of body, it is of the utmoſt importance to keep the lungs as free from action as poſſible. Hence coughing, laughing, and even much ſpeaking or deep inſpirations, ſhould be rigidly guarded againſt. Attention to this point is neceſſary in every wound of the thorax, but it is more particularly ſo in thoſe which affect the lungs; for when this viſcus is wounded, it can never be fully diſtended with air without ſtretching every blood veſſel that has been hurt.

Notwithſtanding, however, of our utmoſt attention, the patient will ſometimes ſink under the loſs of blood; in other caſes, blood will be collected in conſiderable quantities betwixt the pleura and lungs, ſo as to impede reſpiration; or abſceſſes will form, as we have obſerved above, in the ſubſtance of the lungs.

We have already conſidered the method of treatment in collections of blood ſeated between the pleura and lungs: at preſent we ſhall offer a few remarks on the management of abſceſſes in the lungs.

Matter collected in the ſubſtance of the lungs from a wound, may be diſcharged in three different ways. It may be ſpit up by the mouth; it may be diſcharged by the abſceſs burſting into the wound itſelf; or it may be emptied into one or other of the cavities of the cheſt between the lungs and pleura.

When an abſceſs in this ſituation opens into the bronchiæ, there may often be ſome riſk at firſt of immediate ſuffocation; but when this danger is over, by a conſiderable quantity of the matter being diſcharged, if there is no conſtitutional or hereditary pthiſical tendency, a cure will often be accompliſhed by the means uſually adviſed in ſuch caſes, namely, by a diet that is light and of eaſy digeſtion, and at the ſame time ſufficiently nouriſhing; and by daily moderate exerciſe, by which any matter collected in ſuch abſceſſes is brought up with more eaſe than by any other means. A ſea voyage too anſwers particularly well for this purpoſe, at the ſame time that it tends to brace and invigorate the conſtitution; but when this cannot be obtained, we adviſe riding on horſeback. When pus collected in the lungs is diſcharged in this manner, the buſineſs of a ſurgeon becomes altogether unneceſſary; but when the abſceſs either empties itſelf into one of the cavities of the cheſt, or points outwardly at the wound, we have it often in our power to ſave the patient by an operation, when otherwiſe he would inevitably die.

When an abſceſs burſts into one of the cavities of the cheſt, the matter ſhould be diſcharged in the manner we have mentioned in the XXIIId. Chapter, above alluded to: But when the wound by which the collection is produced remains open, ſo as to admit of the matter to point towards it, as ſoon as this is diſcovered, either by a ſmall oozing of pus taking place, or by the introduction of the finger between two of the ribs, we ſhould at once determine on treating it on the ſame principles and in the ſame manner with abſceſſes in any other part of the body, namely, by making an opening into it of a ſufficient ſize for diſcharging the matter. The delicate nature of the part in which the matter is ſeated may be a means of deterring ſome from adopting this practice; but it does not require much argument to ſhow, that a patient in ſuch circumſtances runs much more riſk of ſuffering by the matter being allowed to remain, than by making an opening into the abſceſs. By the laſt meaſure he avoids the hazard of immediate death, which often happens from large abſceſſes burſting into the bronchiæ; at the ſame time that it prevents the matter from paſſing into the cavity of the cheſt, between the pleura and ſurface of the lungs; and thus obviates the neceſſity of a ſecond operation. Nay, in caſes of this perilous nature, I would even go farther: When from a previous diſcharge of matter we are certain that an abſceſs has formed in the lungs, as a conſequence of a wound; when a ſtoppage of this diſcharge takes place, and is ſucceeded by all the uſual ſymptoms of a freſh collection of matter, ſuch as an increaſed difficulty in breathing; difficulty in lying on the ſound ſide; frequent ſhivering fits; and a hectic pulſe; as in ſuch a ſituation there will be no reaſon to doubt of matter being collected, and as the patient muſt remain in the utmoſt hazard till it be diſcharged, I ſhould think it adviſable to enlarge the external wound not only of the common teguments, but of the intercoſtal muſcles, and to extend the opening for the ſpace of two or three inches; by which more freedom will be given for ſearching with the finger for the ſeat of the abſceſs: and whenever it is diſcovered, I would not heſitate, at whatever depth it may be, to open it, by running a biſtoury along the finger, and puſhing it ſlowly into it. In the courſe of my own experience I have had two caſes of this kind; in which, by this deciſive practice, I had the ſatisfaction of ſaving two lives, which otherwiſe muſt in all probability have been loſt. This was the opinion of other practitioners who attended along with me; and I was ſo much convinced, in both caſes, of matter being collected internally which produced the danger, and of nothing being able to ſave the patient but the diſcharge of it, that after warning the patient of his ſituation, and receiving his approbation, I was reſolved to carry the opening into the ſubſtance of the lungs to the full depth of my finger, rather than to leave him to his fate. In both inſtances I found it neceſſary to go to nearly the length of my finger; and at this depth I was ſo fortunate as to reach an abſceſs containing at leaſt half an Engliſh pint of matter. The patients in both caſes were inſtantly relieved; and altho they were previouſly ſuppoſed to be in the utmoſt danger, with ſcarcely a poſſibility of recovering, they are now, after ſeveral years have elapſed, in perfect health.

making an opening into ſuch a deep ſeated abſceſs, the inciſion ſhould be carried forward in the moſt gradual manner, ſo that no more of the lungs may be injured than is altogether neceſſary: But when once the matter appears, the abſceſs ſhould be laid as freely open as may be proper for an entire diſcharge of it.

In the ſubſequent treatment of an abſceſs of this kind, much attention is required in preſerving a proper aperture for the diſcharge of any matter that may afterwards form in it: for if this be neglected before the abſceſs is filled up from the bottom, a new collection will ſoon take place, and the patient will be reduced to the ſame ſtate of uncertainty and danger he was in before. In wounds which do not penetrate deeper than the teguments or muſcles of the thorax, we have obſerved above, that no kind of tents ſhould be employed; and have rather adviſed them to be laid open through their whole length, or to be treated by means of a ſeton, as we do ſores of a ſimilar nature in other parts of the body. But as this is impracticable in penetrating wounds, we are in theſe under the neceſſity of inſerting a tube into the opening, and of continuing it of a ſufficient ſize and length during the whole courſe of the cure: it ought indeed to be continued as long as any matter is diſcharged. Tubes of lead being more ſoft and pliable than thoſe of any other metal, are therefore to be preferred: They ſhould be broad, and of a round oval form rather than altogether round; and they ſhould always be furniſhed with a brim conſiderably broader than the opening of the ſore, to obviate every poſſibility of their falling into the cheſt. By inattention to this point, a tube of four inches in length, and of a correſponding thickneſs, paſſed altogether into the cavity of the breaſt of a gentleman who had uſed it for ſome time; and notwithſtanding various attempts to extract it, it ſtill remains lodged. It was fixed in the uſual way, by a thread, to a bandage going round the body; but the thread breaking, it immediately ſlipped in. This happened upwards of a year ago. The patient does not indeed experience much uneaſineſs from it; but it had an evident effect in increaſing the quantity of matter diſcharged from the wound.

I have met with ſome caſes of wounds in the cheſt, where ſolid tents have anſwered the purpoſe equally well with tubes; and they may always be uſed when the parts do not contract ſo cloſely round them as to prevent the matter from being freely diſcharged: But whenever they ſtop up the paſſage ſo much as to produce any collection of matter from one dreſſing to another, they ſhould undoubtedly be laid aſide, and tubes uſed inſtead of them.

As tents had been uſed for a great length of time in almoſt every wound which penetrated beyond the common teguments, Belloſte, and ſome other ſurgeons of obſervation, ventured at laſt to lay them in a great meaſure aſide. We have already had occaſion to obſerve, that this, to a certain length, was highly proper; but I cannot agree with ſome modern practitioners, who aſſert, that tents and tubes do miſchief in every caſe, and that they ſhould never be employed. Where the diſcharge from a wound or abſceſs will continue free and uninterrupted, till a cure is effected by the parts filling up from the bottom, I would never adviſe either a tent or a tube to be uſed. But when we find that the external opening of a wound heals up long before the parts beneath are united; and that matter collects and burſts out again, as in different inſtances has happened in the courſe of my experience in penetrating wounds of the cheſt, it muſt be from want of experience only, or from a deſire of appearing ſingular, that we refuſe to employ the only certain method with which we are acquainted of obviating this inconvenience, and of ſaving the patient a great deal of pain, trouble, and danger.

In extenſive wounds of the thorax, where any portion of the ſternum or of the ribs have been removed, a portion of the lungs ſometimes protrudes, and does not readily recede. When a practitioner is called ſoon after the accident, the protruded part ſhould be replaced as quickly as poſſible : but when a portion of the lungs has been long expoſed to the air, and eſpecially if it has been much lacerated by the accident, we ſhould, in the firſt place, ſee whether or not it be in a ſtate of mortification ; and all that is clearly and completely mortified ſhould certainly be cut off before the remaining ſound parts are replaced. If the inciſion be confined to a part that is entirely gangrenous, there will be no riſk of inducing either hemorrhagies or any other ſymptom ; and by removing parts which are in this ſtate of diſeaſe, we will prevent all the bad conſequences which might enſue from their being returned into the thorax.

§ 5. *Of Wounds of the Heart and large Veſſels connected with it, and of Wounds of the Thoracic Duct.*

In wounds of the heart and large blood veſſels connected with it, as theſe parts lie very deep, and as a ſound ſtate of them is ſo immediately neceſſary for life, the utmoſt danger is always to be dreaded, nor is the greateſt exertion of practitioners able to leſſen it. Of ſuch a hazardous nature indeed is every injury of this kind, that we may with propriety conſider every wound of theſe parts as mortal : For although we are told in books, of the heart itſelf having been wounded without any fatal conſequences enſuing, there is much cauſe to ſuſpect that theſe accounts are founded on fallacy or error. We can, however, conceive that the heart may be ſlightly injured without proving inſtantly fatal ; but even the ſlighteſt wound in it muſt probably at laſt end in death : For the weakneſs induced in this manner upon a particular part, will render it very liable to yield to the ſtrong and conſtant action of this organ. And when once an aneuriſm is formed in it, it will be apt to proceed with rapidity to a fatal termination.

The moſt probable method of preventing this, or at leaſt of delaying it, is to leſſen the action of the heart by copious blood letting, by low diet, keeping the bowels moderately open, and avoiding every kind of fatigue: If in ſuch circumſtances it is poſſible to ſave a patient, theſe will be the moſt certain means of doing it; at any rate they will tend to prolong life, which in ſome caſes is of ſo much moment, that a few days or even a few hours may be of the utmoſt importance.

The ſame obſervations are applicable to wounds in the large blood veſſels about the heart. They are to be conſidered as of equal importance and danger, and to be treated by the ſame means with wounds of the heart itſelf.

There is ſtill another organ of importance ſeated in the cheſt, which it is proper to mention here, viz. the thoracic duct; for although wounds in this canal will in moſt inſtances terminate in death, yet ſome advantage may, in particular circumſtances, be derived from an attentive treatment of them. The thoracic duct, after leaving the receptaculum chyli, runs along the ſpine near to the aorta; and at the fifth or ſixth vertebra of the back, it paſſes behind the aorto; and aſcending to the left ſubclavian vein, it there empties the chyle.

We judge of the thoracic duct being wounded, from the part at which the wounding inſtrument entered; from the diſcharge being either altogether white like chyle, or mixed with a conſiderable proportion of it; and from the patient becoming daily weaker than he ought to do from a wound of the ſame ſize in any other part, owing to the nutritive part of his food being carried off before any advantage is derived from it.

With a view to prevent the diameter of this canal from being diſtended, which at the ſame time will tend to leſſen the extent of the wound, the patient ſhould be kept upon a cooling and very ſpare diet: any food which he takes ſhould not be at regular meals, but in ſmall quantities frequently repeated; nor ſhould he be permitted to take a large draught even of the weakeſt liquor. The bowels ſhould be kept lax; bodily exertion of every kind, and much ſpeaking, or whatever tends to quicken reſpiration, ſhould be avoided.

§ 6. *Of Wounds of the Diaphragm, Mediaſtinum, and Pericardium.*

We judge of the Diaphragm being injured, from the ſituation of the wound, and from the nature of the attending ſymptoms. As this muſcle is in conſtant action during reſpiration, any injury done to it is neceſſarily attended with difficulty in breathing; with much pain during inſpiration, not merely in the wound itſelf, but over all thoſe parts of the cheſt to which the diaphragm is attached: The patient complains of pain over all the region of the ſtomach; ſickneſs, vomiting, and a troubleſome degree of hickup take place; pains in the ſhoulders ſometimes occur, together with cough, delirium, a quick hard pulſe, and other ſymptoms indicating inflammation and fever. Involuntary laughter is mentioned too as a ſymptom which injuries done to the diaphragm ſometimes produce.

It is a common idea among practitioners, that wounds in the tendinous part of the diaphragm will in every caſe prove mortal, but that injuries done to the muſcular parts of it do not ſo readily prove dangerous. There is much reaſon, however, to believe, that few wounds in the diaphragm are ever cured, whether they be ſituated in the tendinous or muſcular parts of it; nor is it evident from obſervation, that there is more danger to be dreaded in the one caſe than in the other.

The ſymptoms of which we have moſt reaſon to be afraid, are thoſe which proceed either from inflammation or irritation. With a view to prevent their acceſſion, or to moderate them when they have already appeared, blood letting is to be chiefly depended on; together with gentle laxatives; large doſes of opiates conjoined with muſk; warm fomentations over the abdomen and thorax; quietneſs, and low diet.

By theſe means ſtrictly purſued, a patient, in ſuch circumſtances, will have perhaps a better chance of doing well than by any other mode of treatment; but his recovery will by no means be certain. A ſtrict antiphlogiſtic courſe, and large doſes of opium, may probably obviate all the primary ſymptoms. But however ſmall a wound may at firſt be in the diaphragm, the conſtant action and tenſion of this muſcle will be apt to render it daily wider; and we know from various hiſtories of wounds in this part, that they ſeldom arrive at any magnitude, without admitting a portion of the ſtomach, of the colon, or ſome other part of the bowels, to paſs from the abdomen into the thorax; by which the moſt violent pain is produced, together with ſome of the other ſymptoms which uſually accompany a ſtrangulated gut in caſes of hernia: In ſuch circumſtances, a ſtrangulated gut is much more dangerous than a hernia in its more ordinary form; for even although we ſhould be able to remove the ſtricture, by making an inciſion into the cavity of the abdomen, as the paſſage into the thorax would ſtill remain pervious, a return of the ſtrangulation might very ſoon be expected.

Wounds in the mediaſtinum require no peculiarity of treatment. The circumſtances which we have moſt cauſe to dread are, a lodgement of blood in one or both cavities of the cheſt, inflammation and ſuppuration, with its uſual conſequences. But the obſervations we have already made, reſpecting the management of penetrating wounds in other parts of the cheſt, apply with equal propriety to theſe; ſo that we need not at preſent enlarge upon them.

Nor is it neceſſary to enter minutely on the conſideration of wounds in the pericardium. As this bag contains a fluid which we ſuppoſe to be neceſſary for the eaſy motion of the heart, wounds in it may prove dangerous, from their tendency to prevent this fluid from being collected, as well as from their allowing it to ſpread through the cavity of the cheſt. It appears, however, from various obſervations, that wounds in it do not prove ſo hazardous as might at firſt be expected, ed. They require the ſame general method of treatment with penetrating wounds of the thorax, which we have already conſidered.

In every variety of penetrating wounds of the thorax, where the cure is not accompliſhed without the formation of matter, they are apt to heal ſlowly; and in ſome caſes, eſpecially where abſceſſes have formed, a ſtillicidium of matter will continue for many years; nay, in ſome caſes, for life, notwithſtanding all our endeavours to prevent it. As this is an inconveniency which patients are at all times anxious to be free from, practitioners become neceſſarily much intereſted in the method of treating it: and, with a view to leſſen the diſcharge, and even to heal the ſore through its whole extent, aſtringent, and what are uſually termed Vulnerary Injections, have been adviſed. But although I have known them frequently employed even by ſurgeons of reputation, and under the beſt and moſt cautious management, I have ſeldom ſeen them uſed without ſome miſchief accruing from them; and I do not recollect a ſingle inſtance of their being productive of any advantage. They are apt to irritate and inflame the lungs and contiguous parts; and, inſtead of healing the ſore or abſceſs, they are apt to extend it, by tearing open the ſurrounding cellular ſubſtance.

For this reaſon, in wounds penetrating the thorax, I do not heſitate to ſay, that injections ſhould be laid entirely aſide: and, however diſagreeable a tedious diſcharge in this ſituation may prove, that we ſhould truſt entirely to the means we have already adviſed for preventing the matter from lodging, by preſerving as free and depending an opening as the nature of the caſe will admit.

SECTION XII.

Of Wounds of the Abdomen.

§ 1. *Anatomical Deſcription of the Abdomen and Parts contained in it.*

THE Abdomen, or lower belly, is the largeſt cavity in the body; above, it is bounded by the diaphragm, which divides it from the thorax; behind, it is ſupported by the vertebræ; the upper part of both ſides is covered by the inferior ribs; the reſt of it is all bounded by the abdominal muſcles, excepting the moſt depending part of it, which terminates in the pelvis; from the contents of which it is only ſeparated by the pæritoneum; a firm extenſive membrane, which not only lines all the cavity, but affords a coat to all the viſcera contained within it, being reflected in a very ſingular manner over them.

Anatomiſts divide this cavity into different regions. The middle and upper part of it, reaching from the xiphoid cartilage to within a ſmall ſpace of the umbilicus, is termed the Epigaſtrium; the hypochondria are the ſpaces on each ſide of this; the umbilical region extends from three inches or ſo above the navel, to the ſame diſtance beneath it; and all the parts between this and the pubes are termed the Hypogaſtric region.

In the treatment of wounds in the abdomen, a minute acquaintance with the parts contained in it, and of their relative ſituations with reſpect to each other, and to the diviſions or regions which we have juſt deſcribed, is a point of the utmoſt importance. We ſhall here give a general deſcription of the different viſcera: a more particular knowledge of them is beſt acquired from diſſection.

The parts contained in the abdomen are, the ſtomach and inteſtines; the meſentary, omentum, liver, gall bladder, and ducts; pancreas, receptaculum chyli, ſpleen, kidneys, ureters, and upper part of the urinary bladder; the aorta, venacava, and other large blood veſſels and nerves.

The ſtomach is a large membranous bag, placed in the upper part of the abdomen immediately below the diaphragm: It ſtretches from the left hypochondrium, where the moſt capacious end of it is ſeated, obliquely acroſs the epigaſtrium, and terminates before it reaches the right hypochondrium. The ſtomach has two openings; one termed the Superior Orifice or Cardia, where the oeſophagus terminates; and the other the Pylorus, or Inferior Orifice, where the duodenum, the firſt of the ſmall inteſtines, begins. The cardia lies nearly oppoſite to the eleventh vertebra of the back, the large extremity of the ſtomach ſtretching conſiderably to the left; and the pylorus lies ſomewhat lower, and nearly two inches to the right of the vertebræ. It is proper, however, to obſerve, that the ſituation of the ſtomach and of theſe two openings is conſiderably affected by the quantity of food contained in it: So that a wound of the ſtomach, when it is full, may be directly oppoſite to an external wound in the teguments, and yet be ſeveral inches lower when it is empty.

The inteſtines commence, as we have juſt obſerved, at the pylorus, and are continued by many turnings or convolutions to the anus. This canal is in different parts of it diſtinguiſhed by different names: The upper part of the canal is termed the Small Inteſtines; and the under part of it the Larger, from the diameter of the tube being larger in the one than in the other.

Even different parts of theſe great diviſions of the inteſtines have received different names: The upper part of the ſmall guts, extending about a foot in length from the pylorus, is termed the Duodenum: the next portion of the canal, from being commonly found empty, is termed the Jejunum. This in an adult of full growth, is ſuppoſed in general to be about four feet and a half in length: it is chiefly ſituated in the umbilical region. All the under part of the ſmaller inteſtines is diſtinguiſhed by the name of Ileum, from its lying almoſt entirely within the cavity formed by the oſſa ilea on oppoſite ſides of the abdomen. After making ſeveral convolutions from one ſide to another, it at laſt terminates in the cæcum, the firſt of the great inteſtines ſituated under the right kidney. From the cæcum, which is a round ſhort ſac with a ſmall vermiform proceſs, the colon originates: This is the largeſt of all the inteſtines; and as it occupies a conſiderable part of the abdominal cavity, the courſe of it merits particular attention. After leaving the right kidney, to which it is attached, it riſes and paſſes under the liver ſo as to be in contact with the gall bladder, by which it is tinged of a deep yellow: From this it is continued in the form of an arch over the duodenum to the under part of the ſtomach; and paſſing into the left hypocondrium, it is there attached to the ſpleen and to the left kidney. This curvature is termed the Great Arch of the Colon. It now runs downward and backward: and again turning up, ſo as to form the figure of S, it terminates at the top of the os ſacrum in the laſt of the great guts, termed the Rectum, from its running nearly in a ſtraight line till it terminates in the anus.

The inteſtines being very pliable, and of a great length, they have neceſſarily much freedom of motion; but as they would be apt to be entangled in each other, Nature has provided a thin membranous web, termed the Meſentery, which running along the courſe of the inteſtinal tube, ſerves to connect it with ſufficient firmneſs to the vertebræ. The meſentery is evidently a production of the peritonæum: In its duplicature there are a number of ſmall glands, which often become ſo enlarged by diſeaſe as to be felt outwardly through the abdominal muſcles; and it ſerves as a ſupport to the lacteals, blood veſſels, and nerves of the inteſtines. The omentum is a fine thin membrane, which comes into view on laying open the muſcles of the abdomen and the peritonæum. In general, it does not paſs beneath the umbilicus: but in corpulent people, when it is much filled with fat, it ſometimes deſcends to the very bottom of the belly; and in caſes of hernia, it is frequently met with in the ſcrotum.

This membrane is evidently intended as a protection to the bowels; to afford them an additional warmth; and probably by the fat which it contains to lubricate their external ſurfaces, ſo as to admit of their playing with more freedom on each other.

The liver is a large glandular body, ſituated on the right ſide immediately under the diaphragm: It is divided into two lobes; one termed the Great and the other the Small Lobe. The great Lobe lies in the right hypochondrium, which it fills almoſt entirely: it reſts on the right kidney, and covers a portion of the great arch of the colon: a conſiderable part of the ſmall lobe lies in the epigaſtrium; the reſt of it paſſes over the ſtomach towards the left hypochondrium.

The liver is of a very irregular figure; its outer ſurface is arched, correſponding to the figure and ſize of the arch of the diaphragm. On the other ſide, it is in ſome parts flat, and in others concave, according to the figure of the parts with which it is in contact. It is of a conſiderable ſize and thickneſs on the right ſide; but towards the left its thickneſs decreaſes ſo, that at laſt it terminates in a thin edge.

The liver is kept in its ſituation by ſeveral ligaments attached to the diaphragm and contiguous parts.

The gall bladder is a pyriform bag, ſeated in the concave ſide of the liver. The bile, after being ſecreted by the liver, is lodged in this bag, from whence it is conveyed into the inteſtines through the ductus choledochus, which enters the duodenum by piercing its coats in an oblique direction, about five inches below the pylorus.

The pancreas is a conglomerate gland, lying in a tranſverſe direction between the liver and ſpleen, immediately under the ſtomach. The liquor ſecreted by this gland is carried into the duodenum by a ſmall duct, which in ſome caſes terminates in the gut itſelf, and in others near to the extremity of the ductus choledochus.

The receptaculum chyli is a ſmall membranous bag, through which the chyle paſſes from the inteſtines to the left ſubclavian vein by means of the thoracic duct. This bag, or ſac, lies upon the firſt vertebra of the loins, a little to the right of the aorta.

The ſpleen is a large ſpongy body, ſeated in the left hypochondrium, between the ſtomach and the falſe ribs, under the diaphragm, and immediately above and contiguous to the left kidney.

In Chap. XI. Sect. II. we gave a deſcription of the kidneys, ureters, and bladder; ſo that at preſent we need not enter upon it. But, beſides the ſeveral viſcera which we have mentioned, the aorta, vena cava, and the large blood veſſels and nerves which ſupply the bowels, lie all within the abdominal cavity.

We may diſtinguiſh wounds of the abdomen in the ſame manner as we have done wounds of the thorax. They may either be confined to the common teguments and muſcles, or they may penetrate the cavity; or a penetrating wound may be complicated with wounds of one or more of the viſcera.

§ 2. *Of Wounds of the Teguments and Muſcles of the Abdomen.*

In one point of view, wounds of the teguments and muſcles of the abdomen do not merit more attention than ſimilar injuries in other parts of the body: but they become highly important from the contiguity of the abdominal viſcera, and from the danger of theſe being ultimately injured by the neglect or miſmanagment of the external wound.

Our firſt object is to diſcover, whether a wound has penetrated the abdomen or not; and whether any of the viſcera are injured. When the wound is extenſive, and any portion of the viſcera protrudes, the nature of the injury is evident; but in ſmaller wounds where no part of the bowels appear, it is often difficult to judge whether they penetrate the abdomen or not. In general, however, this point may be determined by attention to the following circumſtances: By a proper examination with the fingers or probe, after putting the patient as nearly as poſſible into the poſture in which he received the wound: by the form and ſize of the inſtrument, the depth to which it run, and the direction it appeared to take; by the quantity of blood diſcharged at the wound being conſiderable or not; by the ſtate of the pulſe and other attending ſymptoms; and by the diſcharge of feces, bile, or any other of the abdominal ſecretions.

When the wound is of ſuch a ſize as to admit the finger, we may always determine with certainty whether it reaches the cavity of the abdomen or not; as in this caſe the finger will come into contact with the viſcera: but probes ſhould be uſed with much caution; and unleſs the inſtrument paſſes eaſily in, without force, in a direct line, and to ſuch a depth as to convince us that it has reached the cavity, little or no dependence ſhould be placed upon it: For the parts here are ſo ſoft, and of ſuch a yielding nature, that a probe with very little force will paſs among them almoſt in every direction to a conſiderable depth. It is ſcarcely neceſſary to obſerve, that it is particularly proper, in every inquiry of this kind, to put the patient as nearly as poſſible into that poſture in which he received the wound. And the looſe texture of the parts ſhould prevent us from uſing injections, as is frequently done with a view to determine this queſtion. In wounds of the thorax, where the parts are firmer and more intimately connected, injections may be uſed for this purpoſe more ſafely; but in the abdomen they are apt to ſpread among the muſcles and cellular ſubſtance, by which the teſt is rendered uncertain, at the ſame time that miſchief is apt to enſue from the pain and inflammation which are induced.

The depth to which the inſtrument has paſſed, or the direction which it took, cannot be often aſcertained; but when this information can be obtained, it will aſſiſt us in judging of the nature of the wound. By comparing the ſize of the external opening with the ſize of the inſtrument, we may be led to determine the depth to which it has paſſed.

When the quantity of blood diſcharged from a wound in the abdomen is conſiderable, we may conclude almoſt with certainty, that ſome of the large internal veſſels have been injured; for excepting the epigaſtric artery, which runs in the anterior part of the abdomen in the courſe of the rectus muſcle, none of the teguments or muſcles of theſe parts have arteries of ſuch a ſize as to afford much blood. It is proper, however, to obſerve, that even the largeſt artery in the abdomen may be wounded without any blood being diſcharged externally; for if the outward opening be not conſiderable, and eſpecially if the wound runs in an oblique direction, the blood, inſtead of being evacuated at the opening, will be extravaſated into the cavity of the belly, where large quantities of it may be collected, even without any remarkable degree of tenſion taking place.

In ſuch caſes, however, we are ſoon led to ſuſpect what has happened, by the ſymptoms which enſue. The patient complains of debility and faintneſs; his pulſe becomes low; he is ſeized with cold ſweats; and if the diſcharge of blood be not ſtopped, every other ſymptom of approaching death ſoon make their appearance.

It ſometimes happens again that we are at once rendered certain that a wound has penetrated the cavity of the abdomen, by the diſcharge of feces; of bile; of the pancreatic juice, or even of chyle: and in ſome caſes, the ſame certainty is obtained by large quantities of blood being thrown up from the ſtomach or diſcharged by the rectum. Urine may be diſcharged by a wound which does not penetrate the belly; for the kidneys and ureters may with propriety be ſaid to lie behind the peritonæum, as well as a conſiderable portion of the bladder; but they are in general to be treated in the ſame manner with penetrating wounds in the abdomen.

When, again, none of theſe ſymptoms take place; when neither the finger nor probe can be eaſily introduced; when there is no diſcharge from the wound that leads to ſuſpect the viſcera to be wounded; when the pulſe remains natural; and when the pain is moderate; there will be much cauſe to hope that it has not paſſed to a greater depth than the common teguments or muſcles.

In the treatment of theſe wounds, we are to be entirely directed by the depth to which they penetrate, and by the ſymptoms which take place.

When it is diſcovered that a wound in the abdomen does not run deeper than the common teguments or muſcles, if none of theſe parts have been removed, we will ſeldom meet with any ſymptoms of importance, at leaſt where the habit of body is good, except where they are the conſequence of neglect or miſmanagement. Our views here ſhould be nearly the ſame with what we have adviſed in wounds of the thorax. The principal object is to prevent inflammation and the lodgement of matter: which is done by blood letting; a low diet; the uſe of laxatives; reſt of body; and proper attention to the wound. But for a more particular detail of the proper treatment of ſuch a wound, we ſhall refer to the laſt ſection.

It is proper, however, to remark, that wounds in the boundaries of the abdomen, in one circumſtance, differ materially from ſimilar injuries of the thorax. As the muſcles and other ſoft parts of the cheſt are every

ery where ſupported by bone, the lungs and other viſcera contained in the breaſt do not readily puſh out at the wound; but as the coverings of the abdomen are of a ſoft yielding nature, having anteriorly no bone to ſupport them, and many of the contained parts having no very cloſe attachments, they are apt to puſh forward and protrude wherever any unuſual degree of weakneſs occurs. In all wounds therefore, of the abdomen, even where they do not penetrate, ſome caution is neceſſary from this conſideration alone; and more eſpecially ſo when any portion of the teguments or muſcles has been removed. The patient ſhould be kept as much as poſſible in a horizontal poſture during the whole cure: and when he attempts to ſit or walk, the weakened parts ſhould be ſupported by a proper compreſs, and a firm, ſomewhat elaſtic, bandage of flannel paſſed two or three times round the body; a caution which ought to be perſiſted in for a conſiderable time after the cure of the ſore is completed. By want of attention to this point, very troubleſome caſes of herniæ have occured, which with eaſe might have been prevented.

§ 3. *Of Wounds which penetrate the cavity of the Abdomen, but which do not injure any of the contained parts.*

Although an inſtrument may have penetrated to a conſiderable depth, we have much reaſon to hope that none of the viſcera are wounded, as long as the abdomen remains free from much pain and tenſion, the pulſe ſoft, and the ſkin of a natural heat: But even in this ſtate of ſuch a wound, we are not to conclude that there is no hazard; for it often happens, that wounds in theſe parts, which at firſt exhibit no appearance of danger, at laſt terminate fatally.

It is proper, however, to obſerve, that this may often be traced as an effect of improper management, and that practitioners have it frequently in their power to prevent it: For although ſome inſtances will occur of wounds of this kind ending fatally, where no ſymptoms appeared of the viſcera being wounded, and where after death no immediate injury was found to be done to them, yet this will not uſually happen in ſuch wounds that are properly treated from the firſt.

The danger which occurs here ariſes chiefly from two cauſes: from the acceſs of air to the cavity of the abdomen, by which the different viſcera are apt to become inflamed; and from the ſubſequent formation of matter, which, not finding an opening, will neceſſarily collect within the peritoneum.

In every wound therefore, of this kind, after ſecuring any blood veſſel of the teguments or muſcles that may have been cut, and which we ſhould always do by ligature immediately on its being diſcovered, our next object ſhould be to prevent, with as much certainty as poſſible, all manner of acceſs to the air. In ſmall wounds of theſe parts, this will be done with moſt eaſe and certainty merely by the lips of the cut being drawn together, and ſecured with ſeveral plies of adheſive plaſter: and as a farther ſecurity, a compreſs and flannel roller, ſuch as we have mentioned above, may be put over the whole: The ſame precautions with reſpect to blood letting; a ſtrict antiplogiſtic regimen, and reſt of body, which we recommended in more ſuperficial wounds of the abdomen, ſhould be here carefully obſerved where the danger is more conſiderable.

By this management theſe wounds, when ſmall, will often heal by the firſt intention; but when they continue open for ſome time, they ſhould be dreſſed as ſeldom as poſſible, and the dreſſing ſhould be renewed with as much expedition as the nature of the caſe will admit, ſo that the unneceſſary admiſſion of air may be avoided as much as poſſible.

It will ſometimes happen, however, even that the moſt exact attention will not prevent the acceſſion of bad ſymptoms: At firſt they will moſt readily be of the inflammatory kind, which will be removed by farther evacuations of blood and attention to the other circumſtances we have enumerated; or they will prove fatal, by ending in mortification; or they may terminate, as we have mentioned above, in the formation of matter. It is this laſt occurrence which we have now to advert to.

In ſuch circumſtances, we would adviſe an opening to be made in any other part of the body immediately for the diſcharge of the matter: But in theſe depoſitions in the abdomen, we can never diſcover with certainty, whether any collection has taken place or not, till it has continued for a conſiderable time: for the matter here lies ſo deep, that a ſmall quantity cannot be diſtinguiſhed; nor would it be proper for the diſcharge of a ſmall quantity of matter to incur that danger which always attends the free admiſſion of air to the abdomen; and in ſmall collections this could not be avoided, as there would be a neceſſity of opening them in a ſlow gradual manner with a ſcalpel, as in ſuch caſes the trocar could not be plunged in without much riſk of hurting the viſcera. Inſtead of ſuch an attempt, therefore, we ſhould do nothing as long as the quantity of matter continues moderate, and while no bad ſymptoms have yet taken place. Indeed this is a good general rule in all wounds of the abdomen, never to inquire with much anxiety either for collections of matter, or for ſuch parts as from the nature of the wound there might be cauſe to ſuſpect ſhould be injured, till the appearance of ſymptoms renders it probable that the one or the other has taken place: for by much handling we often do miſchief; while frequently no danger enſues from wounds which at firſt were attended with very alarming ſymptoms. Nay we know, that in different inſtances a perſon has been run through the body with a ſmall ſword without any of the viſcera being injured, and the patient has done well without any bad ſymptom taking place. And we likewiſe know, that violent inflammation will ſometimes terminate favourably without the formation of matter; and even when matter is formed, that it will ſometimes be carried off by abſorption, ſo as to leave no veſtige of its having ever exiſted. It is the actual preſence therefore of bad ſymptoms produced by ſuch collections of matter, or the quantity of matter becoming ſo conſiderable as to prove inconvenient to the patient, that ſhould indicate the propriety of making an opening for diſcharging it: But as ſoon as we find this to be the caſe, we ſhould not heſitate; and whenever there is ſuch a quantity collected as to admit of the trocar being employed, we may draw it off with eaſe and ſafety: For by inſerting the inſtrument in an oblique direction, no air will be admitted; by which the only riſk which attends this operation will be avoided. I have been the more particular upon this ſubject, from having obſerved two caſes of this kind terminate fatally where there was not previouſly any appearance of danger. As it was evident in both caſes that matter was collected, it was determined to diſcharge it; and as it was ſuppoſed to be ſeated either in a particular cyſt, or in the ſubſtance of the muſcles and not in the cavity of the abdomen, it was done by making a ſmall opening into it with a ſcalpel. But in both, the moſt violent ſymptoms of inflammation occurred in the courſe of the firſt two days; and the patients ſoon died. And I conclude that it was by the free admiſſion of air to the cavity of the abdomen that theſe ſymptoms were induced; for after death the matter was found to be lodged in that cavity; and I have ſince that time, in two ſimilar caſes, drawn large quantities of purulent matter off with a trocar, where it was evidently ſeated in the abdomen, without any bad conſequences enſuing.

In drawing off matter from the abdomen, the ſame precautions are neceſſary in doing it that are now ſo univerſally admitted in diſcharging ſerum by the uſual operation of the paracenteſis. But as we gave a particular account of this in Chapter XXI. we muſt now refer to what was then ſaid upon it.

Penetrating wounds of the abdomen may prove dangerous from another cauſe. Conſiderable portions of the bowels are ſometimes protruded, without any other injury being done to them; and this may be productive of fatal conſequences.

The moſt certain method of preventing danger in all ſuch caſes, is to return the protruded parts as quickly into the belly as can be done with propriety. Almoſt every writer upon this ſubject deſires us in the firſt place to foment them with warm emollient decoctions, or to cover them for ſome time with the web or omentum of ſome new killed animal: but they do not recollect, that during the time loſt in making theſe preparations, the protruded parts will probably ſuffer more than can be gained by the application of them; and that the moſt natural, as well as the moſt proper fomentation for them, is the heat and moiſture of the patient's belly. In recommending theſe applications, it is ſaid, that they not only remove the dry parched ſtate of the parts which expoſure to the air is apt to induce; but by means of them we are enabled to judge with more certainty whether or not they are in a ſtate that admits of their being returned with ſafety: for it is alleged, even by ſome writers of reputation, that parts which are apparently in a ſtate of incipient gangrene, and which otherwiſe we might be afraid of puſhing into the abdomen, may, by a proper uſe of theſe fomentations, be ſo far recovered as to render it highly proper to return them.

But although this opinion has been very generally received, and the practice followed which it inculcates, it appears to me to be ſo fraught with impropriety and danger, that I cannot paſs it over without mentioning in the ſtrongeſt manner the idea I entertain of it. Much miſchief may be produced by it, and I ſee no advantage that can accrue from it.

By many it is ſaid, that no part of the inteſtines ſhould be returned into the abdomen that have once acquired any tendency to gangrene, on account of the riſk of the feces burſting into the belly, by which the patient would neceſſarily die. Wherever there is a certainty of ſuch an occurrence, by the parts being actually in a ſtate of gangrene, to return them to the abdomen would no doubt be highly improper, as it would be depriving the patient of the only chance which he can have of a recovery, that of ſecuring the ends of the ſound parts of the gut at the mouth of the wound, by which there may be ſome poſſibility of their uniting afterwards, as has happened in different inſtances; and by which he will at leaſt be certain of having at all times a free diſcharge for the feces. But although in this ſituation the practice we allude to is to be conſidered as highly proper, yet when gangrene has not actually taken place, as there will ſtill be ſome cauſe to hope that the natural heat of the belly may prevent it, the parts ſhould be inſtantly returned.

When parts protruded from the abdomen are covered with ſand, duſt, or any other extraneous matter, it will no doubt be proper to clear them of it before they are replaced; and with this view, bathing them in warm milk, or in milk and water, may anſwer better than any other method. But this is perhaps the only cauſe that can render the practice neceſſary.

Some addreſs is neceſſary in returning any part of the inteſtines which have been protruded in the eaſieſt manner. The patient ſhould be put into that poſture which will moſt effectually relax the parts in which the wound is ſeated, with his head and cheſt ſomewhat lower than the abdomen and buttocks, ſo that the weight of the bowels may have ſome effect in dragging in the protruded parts. When in this ſituation, the ſurgeon having his fingers dipped in warm oil, or covered with ſoft oiled linen, ſhould endeavour to replace the parts by beginning his preſſure at one of the ends of the gut, and continuing it along the doubling or curvature to the other. In this manner any portion of the bowels will be eaſily replaced without any farther enlargement of the wound, when the opening is not very ſmall: And when any part of the omentum, or any others of the viſcera, are protruded, there will be ſtill leſs difficulty in returning them. But conſiderable parts of the inteſtines are frequently puſhed out at ſuch ſmall punctures, that they cannot be returned but with much more preſſure than ſhould ever be applied to them. In this caſe, our object will be more eaſily accompliſhed, and with leſs hazard to the patient, by enlarging the opening, than by the application of ſo much force as is generally required in puſhing any conſiderable portion of gut through a ſmall aperture. Some dexterity, however, is neceſſary in enlarging an opening in this ſituation. When the aperture is of ſuch a ſize as to admit the finger of the ſurgeon, it may be done with eaſe and ſafety: but in ſome caſes it is ſo completely filled with the parts which paſs through it, that this is impracticable. In this ſituation, we are adviſed by authors to inſert a director between the bowels and the parts to be divided, and to enlarge the opening by cutting upon it either with a ſcalpel or biſtoury. This, however, muſt be attended with much hazard; for we can never diſtinguiſh with certainty whether ſome plies of the bowels be elevated by the director or not, as this will ſometimes happen notwithſtanding all our care to prevent it. Inſtead of following this method, I have in different caſes enlarged the opening, by making an inciſion through the integuments and muſcles with a ſcalpel, in the ſame gradual manner that we operate in caſes of hernia; taking care, as ſoon as the peritoneum is laid bare, to introduce the end of a probe pointed biſtoury between it and the gut, and dividing it as far as may be neceſſary, which now may be done with entire ſafety. If in this manner the opening be enlarged ſo as to receive the point of the finger, it may afterwards be increaſed at pleaſure, by inſerting the finger ſo as to act as a conductor for a biſtoury or ſcalpel: But till it can be done in this way, no cutting inſtrument ſhould ever be paſſed into the abdomen; for although much ingenuity has been ſhown in the invention of inſtruments with wings to protect the bowels in this part of the operation, yet none of them anſwer any other purpoſe than to render the buſineſs more complex.

In enlarging a wound in this ſituation, it ſhould be done as much as poſſible in the direction of the muſcular fibres of the parts; and, for an obvious reaſon, the inciſion ſhould commence at the bottom of the wound, and be carried downwards, and not at the top.

We may thus enlarge the opening to any neceſſary extent, always taking care not to make it larger than the nature of the caſe may require. And this being accompliſhed, the protruded parts ſhould be replaced with as much expedition as poſſible in the manner we have adviſed. In returning bowels to the abdomen, it has ſometimes happened, through confuſion or miſtake in the operator, that they have been puſhed in between the layers of the abdominal muſcles. This ſhould be guarded againſt with the utmoſt attention; for when left in this ſituation, the patient will be nearly in the ſame danger as at firſt. Indeed this will be the caſe if they be not placed altogether within the peritonæum.

The accident we allude to may happen in any part of the belly, when a ſurgeon is not ſufficiently accurate and attentive: but it is moſt likely to occur in wounds that paſs through either of the recti muſcles, owing to the ſheaths of theſe muſcles being particularly looſe and flaccid; and it will more readily happen in corpulent people than in others, owing to the great depth of fat and cellular ſubſtance which, in ſubjects of this deſcription, lie above and between the different muſcles of the abdomen.

Inſtead of enlarging the opening in the abdomen, it has been propoſed to diſcharge the air contained in the protruded portion of the bowels by making holes in it with a needle, by which the bulk of it may be ſo much diminiſhed as to admit of its being eaſily replaced at the ſame opening. As this has been mentioned by writers of experience, I think it right to ſpeak of it; but it is chiefly with a view to caution the younger part of the profeſſion againſt it. It may indeed be done with more eaſe to the operator; but this appears to be the only argument in its favour: For although ſome may have recovered on whom it has been practiſed, yet ſurely the ſmalleſt opening made into the gut muſt be attended with much more danger than can probably ariſe from the external opening in the teguments and muſcles being ſomewhat enlarged. And beſides, in reducing protruded bowels, however diſtended they may be with air, we may often render them perfectly flaccid by preſſing the air contained in them into that part which remains in the abdomen. And if this be cautiouſly done, it may at all times be attempted with ſafety. Indeed no trial ſhould ever be made for the reduction of a portion of inteſtine that is much inflated, till we have endeavoured in this manner to reduce the ſize of it.

After the bowels are replaced, our next object is to preſerve them in their ſituation till the wound is ſo firmly conſolidated as to prevent them from falling out. When the opening is ſmall, this may be effectually done by laying the patient in a proper poſture, with his head and buttocks elevated; by preventing coſtiveneſs; and by a firm roller of flannel paſſed ſeveral times round the body, ſo as to ſupport the injured parts till they are united. But in extenſive wounds of the abdomen, it is found, even when they are treated with every poſſible attention, that it is difficult, and in ſome caſes impoſſible, to prevent the bowels from prolapſing by the ordinary dreſſings and bandages. In ſuch caſes, we are under the neceſſity of drawing the ſides of the wound together by ſutures; an operation commonly termed Gaſtroraphy.

Various methods have been propoſed for making this ſuture; but the common interrupted ſuture, or the quilled ſuture, which is merely a variety of the other, anſwers the purpoſe better than any of them. Much care and attention, however, is neceſſary in paſſing it, particularly in avoiding the bowels, which every where lie contiguous to the parts to be united.

The ſurgeon being provided with a number of broad flat ligatures, ſufficient for the extent of the wound, and of a ſtrength that will retain the parts together, each ligature ſhould be armed with two large curved needles, one towards each end; and the patient being laid in a poſture that is moſt eaſy for himſelf, at the ſame time that it relaxes the injured parts moſt effectually, the ſurgeon ſhould now inſert the fore finger of his left hand into the wound, and being ſure that it is in contact with the peritonæum, without any of the bowels lying between them, he ſhould now paſs the point of one of the needles along his finger to the diſtance of an inch at leaſt from the edge of the wound; and having ſecured the other end of it with the thumb and palm of his hand, he muſt now puſh it outward, ſo as to make it pierce the ſkin at a ſimilar diſtance from the external wound in the teguments. In this he will be much aſſiſted by preſſing the muſcles and ſkin down upon the needle with his right hand: and one of the needles being paſſed, the other muſt in like manner be puſhed through the oppoſite ſide of the wound, by carrying it alſo from within outward. It might indeed be done by entering the needle outwardly, and carrying it in upon the finger: but we could not in this manner avoid the bowels with ſuch certainty; a point of the utmoſt importance, and requiring the niceſt attention.

The firſt needles ſhould be paſſed within half an inch of the upper part of the opening; and the others ſhould be continued to within an equal diſtance of the bottom, at the diſtance of three quarters of an inch from each other; for as the retraction of parts divided in this manner is more to be dreaded than any other occurrence, it ought in a particular manner to be guarded againſt. The ligatures being all inſerted, the parts ſhould now be ſupported by an aſſiſtant; and a proper knot being tied upon each of them, the whole extent of the wound ſhould be covered with a pledgit of lint ſpread with any unctuous ſubſtance, for preventing acceſs to the air. After this, the parts ſhould be ſupported with a roller: The patient ſhould now be put to bed, and ſhould be treated in the manner we have directed above, with blood letting, and a low regimen, in proportion to the violence of the ſymptoms which ſupervene.

In performing this operation, I have ſaid that the ligatures ſhould be continued to within half an inch of the bottom of the wound; which is contrary to the uſual practice. In general an opening is left beneath, with a view to diſcharge any matter that may form in the courſe of the cure; but there is no ſufficient reaſon for doing ſo. Inſtead of proving ſerviceable, it is probable that it muſt often do harm, by giving free acceſs to the air, which in every wound of the abdomen ſhould be particularly guarded againſt. The opening could not be preſerved without the aſſiſtance of a tent, by which much irritation and pain might be induced: nor would it ever anſwer the purpoſe of diſcharging the matter, excepting it be accidentally ſituated near to the under part of the abdomen. I am clear, therefore, that the whole extent of the wound ſhould be treated in the ſame manner; and if matter ſhould afterwards form, that it will be better to truſt to its being abſorbed, or even evacuated by the trocar in the manner we have already mentioned, than to truſt to this precarious method of treatment.

When any practitioner prefers what is uſually termed the Quilled Suture, the one we have deſcribed may be eaſily converted into it, by introducing each of the ligatures double. After all the ligatures are paſſed, a ſmall roll of plaſter, or a piece of a large bougie, ſhould be paſſed through the different loops, which ought all to be on one ſide of the wound; and a ſimilar roll being placed on the oppoſite ſide between each of the ligatures, they muſt now be tied upon it with running or bow knots, of ſuch a tightneſs as may appear to be neceſſary; care being taken during this part of the operation to have the ſides of the wound properly ſupported by an aſſiſtant.

If the parts are properly and equally drawn together, we will ſeldom find it neceſſary to remove the ligatures till the parts are united; which they will always be in ſix or ſeven days, if they have been kept in cloſe contact, and if no unuſual cauſe has occurred to prevent it. But when the ligatures give much pain, and eſpecially when the patient complains of much tenſion over the abdomen, the knots ſhould always be untied and kept perfectly looſe, till by blood letting, fomentations, and gentle laxatives, theſe ſymptoms are removed, when the parts may be again drawn together and ſecured as before.

We have hitherto been ſuppoſing that the protruded part conſiſts of a portion of the alimentary canal only, this being the part which in wounds of the abdomen is moſt frequently puſhed out: but it is proper to remark, that the other viſcera are alſo liable to be protruded, particularly the ſtomach and omentum. This, however, does not vary the method of treatment, which ought to be nearly the ſame which ever of the viſcera be puſhed out. The parts ſhould in every inſtance be replaced as quickly as poſſible, and retained in the manner we have already pointed out.

We are now to conſider the treatment of thoſe wounds in the abdomen which are attended with injuries done to one or other of the viſcera. And in the firſt place, wounds of the alimentary canal require our attention, as being moſt frequent.

§ 4. *Of Wounds of the Alimentary Canal.*

In a former part of this ſection we have obſerved, that wounds of the inteſtines may be diſcovered by the diſcharge of blood from the mouth and by the anus, as well as by the diſcharge of feces from the wound in the teguments: We likewiſe judge of this point by the diſcharge of fetid air from the wound, and from the depth and direction in which the inſtrument appeared to run.

By attending to theſe circumſtances, and to the ſymptoms with which wounds in the inteſtines are commonly attended, ſuch as nauſea, ſickneſs, violent gripes, or pains through the abdomen, cold ſweats, and faintings, we may in general determine with much certainty whether they are injured or not. But unleſs the wounded part be brought into view, little or no advantage is gained by the diſcovery: for while it remains undiſcovered, our method of treatment muſt be nearly what we have recommended for wounds which merely penetrate the cavity. Authors indeed direct us to ſearch for the wounded part of the gut: But as the danger from the extent of the wound, which in this caſe would be requiſite, as well as from the expoſure of the contents of the abdomen, would probably be greater than from allowing the wounded part to remain, this attempt ought never to be made; the more eſpecially as we know that wounds in the inteſtines have been healed, although the injured part has not been diſcovered.

When we find, however, that a wound is inflicted on a portion of protruded gut, we ought by no means to replace it till we endeavour to prevent its contents from being effuſed into the cavity of the abdomen; which can only be done by ſewing up the opening.

There are different methods propoſed for ſecuring openings of this kind. Le Dran thinks that it may be done with moſt ſafety by what he terms the Looped Suture; while the generality of practitioners effect it by the Glover's Suture. The looped ſuture is performed in the following manner: One end of the wound is to be held by an aſſiſtant, while the ſurgeon does the ſame with the other; and the needles, which ſhould be round, ſtraight, and ſmall, carrying each of them a thread a foot long, muſt be equal to the number of ſtitches intended to be made. As many of the ligatures are now to be paſſed through both lips of the wound as appear to be neceſſary, taking care that they are nearly a quarter of an inch diſtant from each other. The threads being all paſſed, and the needles removed, all thoſe on one ſide of the cut muſt be tied together with a knot at their ends, and thoſe on the oppoſite ſide muſt afterwards be ſecured in the ſame manner. They are now to be joined together, and to be twiſted two or three times round, ſo as to form a kind of a cord: By this means the divided parts of the inteſtine are puckered together, ſo that the ſtitches, which before were diſtant about a quarter of an inch, are now brought cloſe to each other. The ſuture being thus finiſhed, an aſſiſtant muſt hold the two ends of the twiſted threads, whilſt the ſurgeon replaces the inteſtine in the manner we have already directed. The threads are to be ſecured to the bandage, which is put over the dreſſings; and after remaining till the wound in the gut may be ſuppoſed to be healed, they are to be untwiſted; and one ſide of each of them being cut off cloſe to the external wound, they muſt now be drawn cautiouſly and ſeparately away.

The principal objection to this method of ſtitching theſe wounds is, that in ſome degree it muſt contract the diameter of the gut, by which dangerous obſtructions might afterwards be produced. Inſtead of it the Glover's Suture, as it is termed, is commonly practiſed. In making this ſuture, a ſmall, fine, round needle ſhould be uſed, armed with a thread of ſilk. The ſurgeon laying the lips of the wound exactly together, muſt perforate both at the ſame time; and carrying the needle to the ſame ſide at which it entered, he muſt now make a ſecond ſtitch at a ſmall diſtance, perhaps at the eighth part of an inch from the firſt; and in the ſame manner muſt continue, by a proper number of ſtitches, to draw the whole extent of the wound together. This being done, a ſufficient length of the thread is to be left out at the external wound, for the purpoſe of drawing it away when we ſuppoſe the wound in the gut may be united.

Even this method of treatment, however, muſt evidently tend to leſſen the diameter of the gut; and I think the operation may be performed with the ſame degree of ſecurity, and in a manner that will obviate this difficulty, by entering the needle always from the inſide of the gut, and puſhing it outward. The operation ſhould commence near to one end of the wound: the needle being puſhed through one ſide of the gut, the ligature ſhould be drawn forward and retained by a knot formed on the end remaining in the inſide. The needle muſt now be carried ſtraight acroſs and entered in a ſimilar manner, ſo as to pierce the oppoſite ſide of the wound alſo from within; but the following and every ſucceeding ſtitch will not be oppoſite to each other. When the operation is rightly performed, the needle will be carried from one ſide of the wound in a diagonal line to the other, and will enter the gut at the diſtance of two tenths of an inch from the point which it came from on the oppoſite ſide. In this manner the ſides of the wound may be drawn cloſely and exactly together, without leſſening the diameter of the gut in any degree; and the end of the ligature may at laſt be ſecured and cut off cloſe to the other extremity of the wound, if the gut is to be put freely into the abdomen; or it may be left of a ſufficient length to hang out at the wound in the teguments, if it is the meaning of the operator to retain the wounded part of the inteſtine in contact with the external opening. This indeed is uſually done, that we may have it in our power, as it is ſaid, to draw away the ligature on the wound of the gut being cured. It is probable, however, whatever ſuture may be employed, if more than one or two ſtitches have been paſſed, that it will be very difficult, and even uncertain, our getting the ligature away, without hurting the inteſtines more than we ought to do. I would never adviſe, therefore, with any view of this kind, that the ligature

ature ſhould be left out at the wound; leſs danger will ariſe from cutting it entirely away, and allowing the ſtitches to remain: a conſiderable part of it will fall into the cavity of the gut; and in ſuch circumſtances the danger of the patient from other cauſes is ſo great, that any additional riſk that can occur from the remaining part of it, muſt be ſo trifling as not to deſerve notice. But in extenſive wounds of the inteſtines, where there may be much cauſe to fear that the operation will not prove ſucceſsful, with a view to prevent the feces from being emptied into the abdomen, it may be proper, by means of the thread uſed for the ligature, to retain the injured part in contact with the wound in the peritonæum. But of this we ſhall preſently ſpeak more particularly.

This is the method of treatment which we would adviſe when the gut is not cut entirely acroſs; and, however ſmall a wound of the inteſtines may be, it ought always to be ſecured with a ligature: for although it is alleged by ſome authors, that we ſhould rather truſt to nature for the cure of a ſmall opening here than to inſert a ligature; to me it appears that their opinion is by no means well founded; inſomuch that I would not leave even the ſmalleſt opening that could admit either feces or chyle to paſs without ſtitching it up. But where any part of the alimentary tube is cut completely through, ſome difference will be neceſſary in the method of mangement.

When both ends of the divided gut protrude at the wound, it ought to be our object to bring them into contact in ſuch a manner as to admit of their uniting. There are different modes of effecting this. It has been done by ſtitching the two ends of the gut to the peritonæum and abdominal muſcles, exactly oppoſite and contiguous to each other; and although the feces muſt in this manner be evacuated for ſome time by the wound, yet different inſtances have occurred of the two ends of the gut adhering firmly together, and being completely united in the courſe of a very ſhort time: Of this two caſes have fallen within my own obſervation.

In ſuch circumſtances we are commonly adviſed to plug up the opening in the end of the upper extremity of the gut, not only with a view to keep the patient clean and comfortable, by preventing the feces from being at all times puſhed out, but to prevent, as we are told, the gut from contracting and from being diminiſhed in its diameter. I am convinced from experience, however, that this precaution is very unneceſſary; and I know that it proves hurtful. Inſtead of introducing tents or doſſils of any kind, the outward ſore ſhould be dreſſed as lightly as poſſible; and if care be taken to keep the patient clean, the reſt ſhould be truſted entirely to nature.

This is, perhaps, the beſt method of managing this variety of wound; but the ſame inattention may be anſwered by inſerting the upper extremity of the divided gut into the end of the other, and ſtitching them together. In this ſituation it would be difficult to draw the divided parts together with a needle and ligature, without hurting the oppoſite ſides of the gut, in any other way than by keeping it extended by means of ſome round body inſerted into it. For this purpoſe it has been propoſed to make uſe of a tube of thin paſteboard or paper; but as this might be laid hold of and kept firm by the ligature, a ſmall roll of tallow is preferable, as it will afterwards melt and paſs eaſily off with the feces. A piece of it, nearly equal to the diameter of the inteſtine, ſhould be inſerted into the end of the upper portion of the gut; and being afterwards paſſed into the other, ſo as to carry the one, to the extent of an inch or thereby, fairly into the other, the two portions ſhould now be ſtitched together with a ſmall needle armed with a fine thread. The ſtitches ſhould be carried completely round the gut; and in order to give them as great a chance as poſſible of ſucceeding, they might even go twice round; firſt at the edge of the under portion of gut, and afterwards about an inch beneath, near to where the upper part of it terminates.

In the inſertion of one extremity of the gut within the other, we have deſired, for an obvious reaſon, that the end of the upper portion ſhould be put into the other; but it requires ſome attention to make the diſtinction. The periſtaltic motion will be obſerved to be more remarkable in the upper diviſion than in the under: But the moſt certain method of judging, is to obſerve at which of the ends the feces or chyle are evacuated. An inverſion of the uſual motion of the bowels might indeed produce a deception; but as this is not a common occurrence, we are not to ſuppoſe that at this particular time it is likely to happen.

In wounds of theſe parts, a portion of divided gut ſometimes hangs out at the wound, while the other end of it has ſlipped into the abdomen. In ſuch circumſtances, authors in general adviſe the end of the gut to be ſtitched to the peritonæum, and other parts contiguous to the wound. If it proves to be the upper part of the gut, the patient, it is ſaid, may live under the inconvenience of an artificial anus; and if it be not near to the upper part of the ſmaller inteſtines, that a ſufficient quantity of chyle may be carried into the blood for his ſupport and nouriſhment. But in the event of this proving to be the under part of the gut, although death would certainly enſue were we to reſt ſatisfied with this, it has ſcarcely been ſuppoſed that we ought to proceed farther.

I am clear, however, that this will not prove ſatisfactory to the feelings of any practitioner poſſeſſed of that degree of fortitude which our art requires, and who has that regard for the ſafety of his patient which every ſurgeon ought to poſſeſs. And although I have adviſed, in wounds of the inteſtines, when no part of them protrude, where we cannot therefore know whether the wound be large or only a ſmall puncture, and where the injured part may be ſo ſituated that it could not be reached without opening the greateſt part of the abdomen, and turning out perhaps the whole alimentary canal, that we had better allow the patient to have the chance of recovering without any attempt to make a diſcovery, and which he may do if the wound is ſmall, than to propoſe a meaſure, which of itſelf might be attended with more hazard than the injury for which it was meant to be a remedy. Yet, when we are rendered certain of the gut being completely divided by one end of it hanging out of the wound, as this will give much cauſe to imagine that the other is at no great diſtance, I think it ought by all means to be ſearched for, by enlarging the external wound ſo as to admit of the fingers of the operator being freely inſerted. Even where the upper part of the gut is protruded, it is worth while to ſubmit to this inquiry, merely in order to have at leaſt ſome chance of avoiding the loathſome inconvenience of an artificial opening for the feces: And where the upper part of the gut has ſlipped in, the patient can have no chance for farther exiſtence if it be not diſcovered. In ſuch a ſituation, therefore, we ſhould not heſitate as to the meaſures.

In wounds of the abdomen, the inteſtines, beſides being protruded and wounded, are ſomtimes mortified; and they are ſometimes mortified without being wounded. But whether mortification be combined with a wound or not, the method of treatment ſhould be nearly the ſame.

Where there is only a tendency to gangrene from the parts being much inflamed, they ſhould be returned immediately into the abdomen, for the reaſons we have given in a preceding part of this ſection. But whenever they are entirely mortified, the black dead ſpot will ſoon fall out; and the remainder being thus reduced nearly to the ſtate of a ſore from any other cauſe, the ſame method of cure will become applicable.

Authors in general, have treated of wounds of the ſmall and great inteſtines ſeparately: but no neceſſity appears for this; they are nearly of the ſame nature, and require the ſame method of treatment. The ſmalleſt injury done to the bowels is always hazardous, and in every inſtance of it our prognoſis ſhould be doubtful. But it is ſaid, that wounds in the ſmaller inteſtines are more particularly dangerous than in the others; from their being more apt to induce violent degrees of inflammation: I have not obſerved, however, that this is confirmed by experience.

§ 5. *Of Wounds of the Stomach.*

In wounds of the abdomen, we conclude that the ſtomach is injured, from the part at which the inſtrument entered, and from the depth and direction in which it appeared to run; from the patient being ſeized with a vomiting of blood; from his complaining of a great and unuſual degree of ſickneſs; of languor and ſingultus; and from the food and drink being evacuated at the wound ſoon after they are ſwallowed.

All wounds in the upper part of the left hypochondrium which paſs to any conſiderable depth, as likewiſe thoſe of the epigaſtrium, will neceſſarily enter the ſtomach; but wounds of any part of the abdomen may reach it when they run in an oblique direction: And it ought to be noticed, as we have elſewhere obſerved, that wounds may penetrate this viſcus when it is full, which would not touch it when empty.

Wounds of the ſtomach muſt always be conſidered as dangerous, and a doubtful prognoſis only ſhould be given; for although there are many inſtances on record of their being cured, yet this is by no means ſo common as to warrant our expecting it.

The ſame plan of treatment which we have adviſed in wounds of the inteſtines applies with equal propriety to wounds of the ſtomach. When the wounded portion protrudes, it ſhould be ſtitched up and replaced as quickly as poſſible. But even where it does not protrude, it ought to be ſearched for; and when the anterior part of the ſtomach only has ſuffered, it will not be difficult to diſcover it. We ſhould not, however, be deterred from the inquiry by the ſeat of the wound: for we may be able to reach it wherever it may be, excepting in the poſterior part of the ſtomach.

It is to be obſerved, that wounds of the ſtomach are more readily diſcovered than wounds of the inteſtines; for theſe laſt are more concealed by convolutions of themſelves, as well as by other viſcera.

In all wounds of the ſtomach and bowels, the patient ſhould be put upon as ſtrict a regimen as his ſtrength will bear; not only with a view to prevent the acceſſion of inflammation, which, as we have formerly obſerved, is the moſt dangerous ſymptom that can occur, but to prevent the injured parts from being diſtended, by which they might be very materially hurt. Inſtead of regular meals, a ſpoonful or two only ſhould be allowed at once; and no more given even in this way than is merely neceſſary to ſupport life. In wounds of the ſtomach and upper part of the ſmaller inteſtines, we might venture in a great meaſure, and at leaſt for ſeveral days together, to truſt to nouriſhing glyſters: but this ſhould be carefully avoided in wounds of the great guts; as the injected liquor might more readily be forced in this way into the cavity of the abdomen than if it had been taken by the mouth.

§ 6. *Of Wounds of the Omentum and Meſentery.*

We have already mentioned the ſituation of theſe parts. But we have no means of judging whether they have ſuffered by wounds of the abdomen or not, if they be not protruded.

When it is found that a protruded portion of omentum is injured, we ought to ſee whether any part of it be nearly ſeparated from the reſt or not: for whatever part of it is in this ſtate, ſhould be immediately removed; or when it has become cold, with much reaſon to dread that it will mortify, it will likewiſe be proper to remove it. But when no appearance of this kind takes place, we ſhould adviſe it to be immediately returned into the abdomen.

In the firſt Volume of this Work, we found it neceſſary to enter upon the conſideration of this ſubject when treating of Herniæ: It will therefore be proper to refer to what we had then occaſion to ſay upon it.

In wounds of the meſentery, what we have moſt to dread is the diſcharge of blood or chyle into the cavity of the abdomen; for as the lacteals, together with a great number of arteries and veins, run in the duplicature of this membrane, it can ſcarcely be injured without ſome of them ſuffering. Whenever any portion of it, therefore, is protruded, it ought to be examined with accuracy: and when any of its veſſels are found to be divided, they ſhould be immediately tied with ligatures; the ends of which being left out at the wound, will admit of their being taken away as ſoon as they are thoroughly ſeparated.

§ 7. *Of Wounds of the Liver and Gall-bladder.*

From the anatomical deſcription we have given of the contents of the abdomen, it appears that the liver will be very apt to be hurt by all wounds that penetrate either the right hypochondrium or epigaſtrium.

The liver does not appear to be poſſeſſed of much ſenſibility; for many inſtances have occurred where ſuperficial wounds in it have healed with the ſame eaſe, and have not induced any more alarming ſymptoms than what uſually occur from wounds of the ſame extent in any other part of the body. But wounds of this viſcus, which paſs to any conſiderable depth, are always to be conſidered as dangerous, from the great quantity of blood which is ſent to it, as well as from the interruption which they may give to the formation of bile, one of the moſt important ſecretions in the body: And they are apt to prove particularly hazardous, from their allowing the bile, which is very ſoon rendered putrid, to be poured into the cavity of the abdomen.

We judge of the liver being injured, from the ſituation and depth of a wound; from the quantity of blood that is diſcharged being more conſiderable than could probably be afforded by any blood veſſels of the integuments or muſcles; from bile being diſcharged along with the blood: from bile tinged with blood being carried into the bowels, and diſcharged both by the ſtomach and anus; from the abdomen being apt to ſwell and become tenſe; and from pain being felt on the top of the ſhoulder, an uſual ſymptom in different affections of the liver.

All that we can do in wounds of this viſcus, is to guard as much as poſſible againſt exceſſive hemorrhagies, and to diſcharge any collections of blood or of bile that may form in the abdomen, when they become ſo conſiderable as to render it neceſſary. We endeavour to prevent or put a ſtop to the hemorrhagy by blood letting, gentle laxatives, keeping the patient cool, and at perfect reſt both in body and mind. And we diſcharge collections of this kind, by making an opening in the moſt depending part of the abdomen, or wherever they may happen to form.

Wounds of the gall bladder are by experience found to prove more dangerous than wounds of the liver; for they are ſtill more difficult to heal, at the ſame time that they are more certainly productive of extravaſation of bile into the abdomen. Inſtances indeed have happened of the bile being ſo completely obſtructed in its paſſage from the gall bladder to the duodenum, that the bladder has ſwelled ſo as to produce much external tumefaction: And, in ſome caſes, theſe ſwellings, after burſting or being opened, have continued to diſcharge bile for a conſiderable time; and at laſt have been known to heal without producing any extravaſation into the abdomen, or any other alarming ſymptom. This, however, proceeds from the previous diſtention of the bladder having produced an adheſion between it and the neighbouring parts; by which, when an opening is made into it, the bile is prevented from ſpreading. But few inſtances have occurred of wounds in this viſcus having a favourable termination. To procure as free a vent for the bile as poſſible, and to diſcharge it by an opening ſuch as we have mentioned, when it collects in the abdomen, is perhaps all that we ought to attempt.

§ 8. *Of Wounds of the Spleen, Pancreas, and Receptaculum Chyli.*

When the ſpleen is laid bare, we eaſily diſcover whether it be injured or not: but as it does not afford any particular ſecretions by the appearance of which we might be determined, and as wounds of it do not excite any remarkable ſet of ſymptoms, it is difficult to judge merely from the depth or direction of a wound whether it be hurt or not. It is obſerved indeed, that the blood diſcharged immediately from the ſpleen is of a peculiar deep red colour; but this teſt is not to be depended on: Nor are we to conclude from the quantity of blood being conſiderable which a wound in the region of the ſpleen may diſcharge, that this viſcus is certainly injured; for it lies ſo near to large blood veſſels belonging to other viſcera, particularly to the emulgent arteries and veins, that no certain judgment can be formed from this circumſtance.

The ſame obſervations which we have made upon wounds of the liver will apply with propriety to wounds of the ſpleen; only we may ſuppoſe, that the danger attending the latter will not be ſo conſiderable, as no material ſecretion will be interrupted by them.

As the pancreas lies deeply covered with the other viſcera, wounds of it can ſeldom be diſcovered: But as a diviſion of the duct of this gland will prevent the ſecretion which it affords from being carried to the bowels, this may, by interrupting or impeding digeſtion, do much injury to the conſtitution; and as the liquor will be effuſed into the cavity of the abdomen, it may thus be productive of collections, the removal of which may ultimately require the aſſiſtance of ſurgery.

Wounds of the receptaculum chyli will be diſtinguiſhed from their ſituation, and from the diſcharge being a thin milky kind of liquor. They muſt neceſſarily be attended with much danger, as they will deprive the patient of the greateſt part, or even of all the nouriſhment which he ought to derive from his food. They can never in any way become the object of ſurgery, but by producing collections in the abdomen which may require to be diſcharged.

§ 9. *Of Wounds of the Kidneys and Ureters.*

In a preceding part of this Work,* we have mentioned the ſituation of the kidneys; an accurate knowledge of which is an object of much importance in judging whether penetrating wounds in theſe parts may have injured them or not. But in general we may be determined by the ſymptoms which take place.

The external coverings of the kidney may be hurt without any ſymptom of importance being induced; but neither the pelvis of the kidney, nor the ureters, can be penetrated without ſome or perhaps all of the following ſymptoms taking place: The patient complains of violent pain, not merely in the part itſelf, but over the whole loins, in the groin, yard, and even in the teſticles; he is liable to much ſickneſs and vomiting; the urine is paſſed with pain and difficulty, and along with it more or leſs blood is uſually diſcharged; and although the greateſt part of the wound may heal, it commonly happens that a fiſtulous opening remains during life.

When the kidney is pierced by a wound entering from the belly, the urine is apt to be extravaſated into the cavity of the abdomen: But when it is wounded from the back, or even from the ſide, the urine will either paſs directly out at the opening, or it will ſpread through the contiguous cellular ſubſtance; for as it is ſituated behind the peritonæum, it will not in this caſe find acceſs to the belly. The riſk, therefore, with which wounds of this organ are attended, will depend in a great meaſure on this circumſtance. When the urine paſſes into the abdomen, the danger will be very great; but when this does not happen, if the patient ſurvives the hemorrhagy with which the wound is at firſt attended, he may have a tolerable chance to eſcape, with the inconvenience of a fiſtulous opening at which the urine will continue to be diſcharged. Inſtances indeed have occurred even of this being at laſt cured; but they are ſo rare, that they are ſcarcely to be looked for. All that art can with propriety attempt, is to prevent the urine from lodging; and, if the ſides of the opening become callous, to render them raw from time to time, either with the ſcalpel or lunar cauſtic, by which they may at laſt be made to unite.

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* Vide Chap. XI. Sect. II.

§ 10. *Of Wounds of the Bladder.*

The bladder when empty, lies altogether within the bones of the pelvis; but when filled with urine, it riſes conſiderably higher, inſomuch that, when the urine is long obſtructed, there are inſtances of its reaching to the umbilicus. In judging, therefore, whether injuries done to theſe parts have penetrated the bladder or not, we muſt know whether it was empty or full. But for the moſt part this point is eaſily determined; as in general the urine comes away by the wound, and even that which paſſes by the urethra is at firſt always tinged with blood.

The danger from wounds of the bladder is always more or leſs according to the ſituation of the injury. As the upper part of this viſcus lies within the cavity of the abdomen, being covered with the peritonæum, punctures in this part are apt to produce an extravaſation of urine into the belly, by which the moſt dangerous ſymptoms are commonly induced: while the under part of it, not being covered with this membrane, is often wounded without any ſymptom of importance taking place, as we daily obſerve in the operation of lithotomy as it is now practiſed in the lateral method.

In wounds of the under part of the bladder, all that we have to do is to dreſs them in the uſual way with ſimple eaſy applications; while by blood letting in proportion to the ſtrength of the patient, by the uſe of gentle laxatives, and a low diet, we endeavour to prevent inflammation, the moſt dangerous ſymptom that attends injuries of this viſcus. And when inflammation has already taken place, we try to remove it by farther evacuations of blood, by doſes of opiates proportioned to the degree of pain, by warm fomentations to the belly, and by the ſemicupium. Indeed, warmth applied in this manner ſeems to have a more certain effect in removing the pain and tenſion of the abdomen, which theſe wounds are very apt to induce, than almoſt any other remedy.

When again the upper part of the bladder is injured, together with the riſk which occurs from inflammation, we have the additional hazard ariſing from extravaſation of urine.

As the danger with which this is attended is always conſiderable, eſpecially when the urine paſſes into the abdomen, it might give the patient ſome farther chance of recovering, to treat wounds of this kind in the bladder upon the ſame principles, and in the ſame manner, that we have adviſed for wounds of the inteſtines; that is, by ſtitching up the wounded part either with the glover's ſuture, or in the manner we have adviſed in a preceding part of this ſection, as may be ſeen in § 4. The glover's ſuture might anſwer equally well with the other; and here it might be uſed with more freedom than in the inteſtines, as the bladder can more readily admit of being ſomewhat diminiſhed in its capacity.

To prevent the inconvenience and danger ariſing from urine being extravaſated into the abdomen, it has been propoſed to draw the opening in the bladder forward to the external wound, and to ſtitch it to the peritonæum and contiguous parts. This may be eaſily done when the anterior part of the bladder is wounded; but when the opening lies behind, to draw it forward and retain it at the wound would be productive of much pain, and might ultimately be attended with more danger than it was meant to prevent. In ſuch circumſtances, I would rather truſt to the wound being neatly ſtitched up, when the parts ſhould be immediately replaced, and the patient treated in the manner we have adviſed for ſimilar injuries done to the inteſtines.

§ 11. *Of Wounds of the Uterus and its Appendages.*

The uterus is a ſtrong muſcular bag peculiar to the female ſex, being ſolely intended for the fœtus. It is of a triangular figure, and is ſituated between the bladder and rectum. In an unimpregnated ſtate, it lies altogether within the bones of the pelvis: but during pregnancy, it riſes ſo high in the abdomen as to touch the umbilicus and even the ſtomach; while the inferior point of it, termed the Os Tincæ, terminates in the vagina, a ſmooth membranous ſheath which runs contiguous to and terminates below the urethra.

The uterus is firmly attached by different ligaments to the contiguous parts: by the ligamenta lata on each ſide, which appear to be doublings of the peritonæum; and by the ligamenta rotunda, which ariſe from the upper corners of the fundus uteri, and paſſing down through the openings in the external oblique muſcle, are loſt in the upper part of the thigh. By the tubæ Fallopianæ, which ariſe near to the ligamenta rotunda, the uterus communicates with the ovaria, two ſmall round bodies placed within an inch and a half of its fundus.

From the uterus ſtretching, and occupying different parts in the different periods of geſtation, it is evident that wounds, which in one ſtate might injure it, in others will paſs conſiderably above it: ſo that in judging from the ſituation and direction of a wound in theſe parts, this circumſtance requires particular attention. In extenſive wounds we may be determined at once by examination with the fingers, whether the uterus be injured or not: But in others, where this is not admiſſible, we muſt be directed entirely by the ſymptoms which take place.

In an unimpregnated ſtate, a wound of the uterus will not be productive of ſymptoms very different from thoſe which occur from wounds of the contiguous parts. But during pregnancy, wounds of this organ will either induce ſymptoms of an approaching abortion; or the quantity of blood diſcharged outwardly by the wound, or that is extravaſated into the cavity of the abdomen, will be very conſiderable. At leaſt this will in all probability happen when the injury done to it is material: for during pregnancy, the quantity of blood ſent to the uterus is conſiderable; and we know from experience, that hemorrhagies which occur from it in this ſtate, ſeldom ſtop till delivery is effected; by which the uterus is allowed to contract, ſo as to compreſs and ſupport the injured veſſels.

In every injury therefore of this kind where ſymptoms of abortion occur, nothing ſhould be done to prevent it; and where they do not take place, and whenever there is reaſon to ſuſpect that the patient may ſuffer from loſs of blood, if the delivery cannot be accompliſhed in the uſual way, the child ſhould be taken out by the Cæſarian operation. In a ſubſequent part of this Work we ſhall have occaſion to deſcribe the method of performing this operation; but in ſuch caſes as we are now treating of, the eaſieſt, and perhaps beſt, method of doing it, will be to enlarge both the external opening and the wound in the uterus to a ſize that will admit of the extraction of the child. In other circumſtances, wounds of the uterus muſt be managed nearly in the ſame manner with other penetrating wounds of the abdomen.

Beſides the ſeveral viſcera in the abdomen and pelvis, which we have now treated of, there are large blood veſſels and nerves which paſs through them, which are alſo liable to be wounded: But as no remedies with which we are acquainted can afford any relief in diviſions of the nerves; and as the large blood veſſels here lie too deep for any chirurgical aſſiſtance, they very univerſally end fatally. A patient may indeed linger long under the paralytic ſymptoms which always ſucceed to injuries done to theſe nerves; but a diviſion of the large blood veſſels of the abdomen in every inſtance proves quickly fatal.

We have thus finiſhed the conſideration of wounds of the thorax and abdomen; and it will be obſerved, that we have entered minutely into it. To this I was induced, not merely by the importance of the ſubject, which I conſider, however, as one of the moſt material that practitioners meet with, but with a view to excite the attention of beginners to an intimate acquaintance with the moſt uſeful part of anatomy, that of the thoracic and abdominal viſcera.

In the preceding ſections we have treated ſeparately of all thoſe wounds, which, from the ſituation, or any other peculiarity of the injured parts, may require any variety in the method of treatment. The extremities indeed are liable to wounds which require a mode of management that has not yet been attended to, namely, thoſe wounds which are complicated with fractures of the contiguous bones: Theſe, however, will fall to be conſidered in the Chapter on Compound Fractures. The only other varieties of wounds which we have now to ſpeak of, are poiſoned or venomous wounds, and gunſhot wounds.

SECTION XIII.

Poiſoned Wounds.

WOUNDS may be poiſoned in various ways: The bites of ſeveral animals, particularly thoſe of the viper, afford examples of poiſoned wounds; and the ſtings of the tarantula, of waſps, and bees, are of the ſame nature. It is evident too, that poiſon is conveyed to wounds by the bites of mad or enraged animals, particularly by the bites of mad dogs: And they may be poiſoned by the matter or ſecretion of various kinds of ſores, as well as by the juices of different vegetables.

The ſtings of waſps and bees and other inſects of this climate, although they may be productive of a good deal of pain, yet ſeldom terminate in any ſymptom of importance: The application of vinegar or ſpirit of wine to the part affected, immediately after the injury, will often prevent that pain, tenſion and inflammation, which would otherwiſe ſupervene: and when once theſe ſymptoms take place, they will for the moſt part be more effectually relieved by waſhing with cold water, or by immerſing the parts in it, than by any other remedy. For the ſting of a ſcorpion, we are adviſed to kill the animal and apply it to the injured part, or to cover the part with a dead toad or ſome other animal ſuppoſed to be of a poiſonous nature. There is much cauſe, however, to imagine, that this practice is founded in prejudice; and we are told, that of late the ſame remedies have been found to prove uſeful in the ſtings of inſects in warm climates, that we have juſt mentioned for the ſtings of bees and other inſects of this country.

As the bite of a viper proves ſometimes formidable, at all times it deſerves particular attention. It is true indeed, that it often heals eaſily without any ſymptom of importance taking place; for the poiſon of this animal being contained in a ſmall bag at the root of each tooth, which it can diſcharge or retain at pleaſure, it would appear that it does not throw it out if it be not much irritated. But as we can never judge with certainty whether the wound be poiſoned or not, we ought in every caſe to be upon our guard. To prevent the poiſon from entering the ſyſtem is the object we ſhould have in view. This, however, can only be accompliſhed when the aſſiſtance of practitioners is procured immediately: for although there is reaſon to ſuppoſe that ſome other kinds of poiſons, even when applied to recent wounds, do not for ſeveral days enter the circulation; yet we know from various occurrences, that this is by no means the caſe with the poiſon of the viper, which commonly begins to operate upon the ſyſtem in the ſpace of twelve or fourteen hours. The patient complains of a violent burning pain in the injured part, which ſoon begins to ſwell. Tenſion and inflammation take place, not merely over the affected limb, but often over the whole body. The patient becomes faint and languid, the pulſe low and feeble; he complains of giddineſs, nauſea, and vomiting; of a fixed pain in the region of the heart; the whole ſurface of the body becomes yellow like the ſkin of a jaundiced patient; the urine appears of a deep yellow, and is evidently ſtrongly impregnated with bile; cold ſweats take place, along with convulſive twitchings in different parts of the body; and if relief be not quickly obtained, death ſoon cloſes the ſcene.

With a view to prevent the acceſſion of theſe ſymptoms, the injured part ſhould either be cut out immediately, or ſhould be deſtroyed with the actual or potential cautery. The ſooner this is done, the more effectual it will probably prove; but it ſhould always be adviſed as long as no bad ſymptom has appeared. In former times ſuction was much employed for the removal of every kind of poiſon in wounds; in ſome caſes by inſtruments kept for the purpoſe, but moſt frequently by the mouth; and it was found where the ſkin of the mouth was entire, that it might be done with ſafety. This might frequently prove ſucceſsful; but where the life of a patient is ſo nearly concerned, that remedy only ſhould be truſted which will with certainty prevent the poiſon from entering the blood, We ſhould not heſitate therefore to adviſe an immediate removal of the injured part; and with a view to render the practice as effectual as poſſible, we ſhould endeavour to excite a plentiful ſuppuration over the ſurface of the ſore; by the application of ſtimulating ointments, when the patient does not complain of pain and tenſion; and by the uſe of emollient poultices, when much inflammation takes place.

But when it appears that the poiſon has already entered the ſyſtem, this local treatment of the ſore is not to be depended on. In ſuch circumſtances, the application of warm oil, not merely to the ſore, but over the whole body, has been much recommended; and it is ſaid that ſome advantage has been derived from the internal exhibition of it: two ſpoonfuls of fine olive oil, given every hour, is ſaid to have allayed the moſt violent ſymptoms which the bite of a viper ever excites. From ſome late obſervations, however, the efficacy of this remedy is much to be doubted; and it would appear that a plentiful ſweat, kept up for a conſiderable time, is the moſt certain method yet diſcovered, not merely of mitigating all the ſymptoms, but of removing them entirely. By whatever means a ſweat is induced, it is found to prove uſeful; but experience ſhows, that ſmall doſes of the volatile alkali, frequently repeated, is to be more depended on for this purpoſe than any other remedy. A particular preparation of this kind, eau de luce, has been much recommended; twenty drops of it to be given every hour. But there is reaſon to ſuppoſe, that any other form of the volatile alkali will prove equally effectual.

All the varieties of theriac, as well as many other remedies, are recommended for the bites of vipers; nay, different remedies are adviſed for the bite of every ty variety of this animal. But as we do not find that any of them are to be truſted, it is not neceſſary to enumerate them.

The moſt formidable wound of a poiſoned nature which we meet with in this country is the bite of a mad animal: for although inſtances daily happen of theſe wounds healing without any ſymptom of importance enſuing, yet whenever they terminate in the hydrophobia, the utmoſt danger is to be dreaded. Indeed the inſtances of patients recovering from this dreadful ſymptom are ſo extremely rare, that we deſpair in every caſe of any of our remedies proving effectual. A variety of noſtrums have been held forth to the public, by which we are told the hydrophobia may not only be prevented, but even cured when it has actually taken place. I have not heard, however, of any well atteſted fact of any of them proving uſeful.

As a preventative of the hydrophobia, nothing with which we are acquainted can be depended on but an immediate removal of the injured part, either with the ſcalpel or with the actual or potential cautery; which, together with a plentiful ſuppuration being excited upon the ſore, has in different inſtances appeared to anſwer the purpoſe effectually: That is, patients who have been treated in this manner have eſcaped, while others bit at the ſame time by the ſame animal have ſuffered.

The ſooner that the part affected is removed after the accident, the more effectual the operation will probably prove: but it had better be done even at the diſtance of ſeveral days than that the patient ſhould be deprived entirely of the chance which it affords; and this eſpecially as there is reaſon to imagine that this poiſon does not enter the ſyſtem ſo quickly as a variety of others are obſerved to do; at leaſt this muſt be the caſe if we can judge from the time at which it begins to operate. For we know, that in moſt inſtances none of the ſymptoms induced by the bites of mad animals appear till a conſiderable time after the accident: It almoſt always happens that ſeveral weeks intervene; and it has been known that a perſon has remained perfectly well after the bite for the ſpace of ſix months, and at laſt has been ſuddenly ſeized with hydrophobia. Whenever we are certain, therefore, that a perſon has been bit by an enraged animal, we ſhould adviſe the part to be cut out at whatever period this may be, provided no ſymptom has appeared of the poiſon having entered the ſyſtem: And the ſore ſhould be kept open for a conſiderable time by the daily application of ſome irritating ointment.

While we place moſt confidence in this treatment, we ſhould not neglect entirely any advantages which we are told may be derived from other remedies. Sea bathing has been much famed in all ages as a preventative of theſe ſymptoms: we have few well atteſted caſes, however, of any benefit being procured from it. By many practitioners, mercury is much depended upon, particularly frictions with mercurial ointment, and the application of it to the ſore; and as this may be employed along with any other plan of treatment that may be adopted, it may be right in every caſe to adviſe it.

It will often happen, however, that neither theſe nor any other means we can employ will prove effectual; and as the province of ſurgery affords no remedy for the ſymptoms which accompany the hydrophobia, as ſoon as they take place, the unhappy ſufferer ſhould immediately receive all the aſſiſtance which phyſicians of experience and obſervation can give.

When wounds are poiſoned by the matter of diſeaſes, as ſometimes happens to ſurgeons in the treatment of ſores, particularly of thoſe of the venereal and cancerous kinds, the beſt practice would be to remove the virus immediately, in the manner we have juſt mentioned in caſes of poiſoned bites, by cutting out the part affected, or burning it with a hot iron. With reſpect to the venereal poiſon, a timid patient may indeed heſitate in the uſe of ſuch a formidable remedy, when he knows that we are poſſeſſed of an antidote which ſeldom fails: Many, however, would endure the momentary pain of a burn or a cut in preference to the ſlow operation of a mercurial courſe. And in caſes of ſores coming into contact with the matter of a cancer, we ſhould not heſitate in adopting the practice immediately; for hitherto we are not poſſeſſed of any remedy upon which any dependence can be placed for the cure of this diſeaſe.

This would likewiſe be the moſt eligible practice in wounds infected with any of the vegetable poiſons. We are told, however, that in thoſe parts of the world where alone it can be neceſſary, that antidotes are univerſally known for every poiſon of this kind; and that the Indians, when they are wounded, can diſcover immediately whether the inſtruments with which they are hurt have been poiſoned or not.

With reſpect to the metallic poiſons, they do not at preſent fall within our conſideration: for however deleterious they prove when taken into the ſtomach, they do not appear to prove otherwiſe hurtful when applied to wounds, than by irritating or corroding the parts with which they come in contact. We are told, indeed, that inſtances have occurred of theſe poiſons entering the ſyſtem even when applied to wounds; and this is mentioned as a reaſon for our not uſing the different preparations of lead with ſuch freedom as is now univerſally done. But although remedies of this claſs are daily employed by almoſt every practitioner, we have not heard of a ſingle well marked caſe of their proving in any degree noxious: Nay, it is to be doubted, whether even the ſalt or ſugar of lead, as it is termed, proves hurtful, even when taken in conſiderable quantities into the ſtomach. We know that in ſmall doſes it may be uſed with perfect ſafety; and I have much reaſon to think that it may be taken even in large quantities with more freedom than is commonly imagined, from its having happened in different inſtances with patients of my own, who by miſtake have ſwallowed and retained a large cupful of a ſtrong ſolution of ſaccharum ſaturni, without any bad ſymptom enſuing.

SECTION XIV.

Of Gunſhot Wounds.

AS wounds made by fire arms are ſuppoſed to be very different from every other kind of wound, they are uſually treated of in ſeparate chapters. We think it right in ſome meaſure to adhere to a cuſtom which has long prevailed; but at the ſame time we muſt obſerve, that this difference conſiſts chiefly in the ſymptoms being for the moſt part more ſevere and violent in gunſhot wounds than in others. Till of late, moſt of the ſymptoms induced by gunſhot wounds were ſuppoſed to originate from poiſon carried in with the ball; and it was alſo imagined, that the ball cauterized or burned the parts as it paſſed along. We now know, however, that theſe opinions are both ill founded; that the injured parts do not ſuffer either by poiſon or from the immediate application of heat; and that all the phenomena in any reſpect peculiar to wounds of this kind proceed from the violent contuſion produced by the paſſage of the ball. Of this we are rendered certain, from there being no poiſon contained either in gunpowder or in any of the articles of which bullets are uſually made; and from obſerving that ſymptoms of a ſimilar nature are often induced by contuſed wounds produced by very different cauſes.

I would therefore conclude, that gunſhot wounds are altogether of the contuſed kind; an idea conſonant to the method of cure, and which will tend to do away that myſtery which has hitherto overſhaded this branch of practice. It has been a prevailing opinion, that there is ſomething ſo ſingular in the nature of theſe wounds, as to render it improper for any practitioners to take the charge of them, but ſuch as have had opportunities of attending fleets and armies, and of ſerving as it were an apprenticeſhip to this branch of practice. There is no good foundation, however, for this opinion; and I have no heſitation in ſaying, that gunſhot wounds ſhould be managed upon the ſame principles, and in the ſame manner, with wounds of any other kind attended with an equal degree of contuſion.

In gunſhot wounds, the ſymptoms we have moſt reaſon to dread are, inflammation, gangrene, and a ſuppuration ſo abundant as to exhauſt the ſtrength of the patient. Theſe are therefore to be chiefly kept in view, and our practice will be more or leſs ſucceſsful in proportion to their mildneſs or ſeverity. In ſome caſes the contuſion is ſo violent and extenſive, that the patient ſuffers from the injured parts being immediately attacked with gangrene. But, for the moſt part, inflammation is the ſymptom from which the greateſt danger ariſes; for if it be not kept moderate from the firſt, it is apt to terminate either in gangrene or in extenſive collections of matter.

To prevent or remove inflammation ſhould therefore be conſidered as our firſt object in every caſe of gunſhot wound: and as nothing tends with ſuch certainty to accompliſh this as local blood letting, any veins or arteries that have been divided by the injury ſhould be allowed to diſcharge freely before they are tied: Excepting indeed where ſome of the larger arteries have ſuffered, I believe it would be a good general rule for practitioners not to interfere in checking any hemorrhagy that may take place. In this they would be warranted, not merely by the known powerful effects of local blood letting in preventing inflammation in general; but by many well atteſted facts, which tend to ſhow that it proves ſtill more particularly uſeful in caſes of gunſhot wounds. Among other proofs of this it may be mentioned, what almoſt every army ſurgeon has obſerved, that ſome of the moſt remarkable cures have occurred among thoſe patients who from neceſſity have been left for a conſiderable time upon the field of battle; by which much more blood is in general loſt than uſually happens with ſuch as either from their rank or other circumſtances are more early taken care of. In every caſe therefore of gunſhot wound, we ſhould at once determine to take as much blood as the ſtrength of the patient will permit; and where the parts are ſo much contuſed that the veſſels which have been divided do not afford a ſufficient quantity, a circumſtance which frequently happens, inſtead of taking it from the arm or any diſtant part of the body, it ſhould be drawn off by the application of a proper number of leeches to the injured parts; or when theſe are wanting, by cupping and ſcarifying the contiguous ſound parts. In general, if this practice be carried a proper length at firſt, the acceſſion of inflammation will be prevented; but when it proves otherwiſe, and when the parts afterwards ſwell and inflame, the operation ſhould be repeated once and again according to circumſtances.

Our next object is to remove any extraneous body that may be lodged in the wound, as far as this can with propriety be done. When a ball has not penetrated deep, and eſpecially when the wound is left entirely open, by a portion of ſkin and teguments being completely removed, there will be little difficulty in clearing away whatever might prove hurtful. But when a wound is found to run to a conſiderable depth, and eſpecially if a counter opening has not been made by the ball paſſing out at the oppoſite ſide, any ſearch that is made for extraneous bodies, ſhould be done with much care and circumſpection. When treating of Punctured Wounds, in Sect. III. of this Chapter, we entered upon the conſideration of this point. We muſt now refer therefore to what was then ſaid; and at preſent ſhall confine ourſelves to this obſervation, that when extraneous bodies lodged in gunſhot wounds can be taken away without fretting or injuring the contiguous parts conſiderably, they ought always to be removed immediately: but when much pain is excited, or a high degree of inflammation endangered by the attempt, we ought to deſiſt. In ſuch circumſtances, it will be better to truſt to the extraneous bodies being afterwards diſcharged along with the matter of the ſore; to nature preſſing them out; or to the parts in which they are lodged being accuſtomed to their reſidence. From much experience we know, that in almoſt every inſtance bullets ſhould be allowed to remain in whatever part they are lodged, rather than that much force ſhould be employed in extracting them. A ball lodged in the ſubſtance of a bone, is perhaps the only exception to this general rule: It cannot indeed be extracted from this ſituation but with much difficulty; and therefore it is in general allowed to remain. I have known ſeveral inſtances of this; but in all of them much pain and danger to the patient, as well as trouble and perplexity to the practitioner, were the conſequences. The unyielding nature of bone, occaſions, upon the lodgement of a foreign body in its ſubſtance, great pain, tenſion, and ſwelling over all the contiguous parts. To prevent theſe, the extraction of the ball, when it can be done without hazard of the patient's life, ſhould be attempted, as ſoon after the accident as poſſible, and before the parts become ſwelled and pained.

Different forceps have been invented for extracting bullets from wounds, and ſome have propoſed ſcrews for this purpoſe: Scarcely any of theſe inſtruments, however, have anſwered the purpoſe for which they are intended; and excepting where a bullet can be eaſily laid hold of with common forceps, no inſtrument of this kind ſhould ever be employed: for beſides tearing and irritating the injured parts, they are apt to catch the contiguous muſcles, or other ſoft parts, by which much miſchief muſt neceſſarily be done. There muſt always be a riſk of this when the wound runs deep; but it ought to be more particularly avoided in wounds of the thorax and abdomen, where laying hold of any of the contiguous parts would neceſſarily be productive of danger. When a ball is not deeply lodged, but lies near to the mouth of the wound ſo that the ſurgeon can ſee it, the forceps may with ſafety be employed ; but whenever it lies deeper than this, if it be judged proper to extract it, a Counter Opening, as it is termed, ſhould be made upon it, ſo as to admit of its being taken out with the fingers. It will commonly happen, indeed, that balls may be extracted with much more eaſe both to the patient and ſurgeon, by judicious openings of this kind, than by the uſe of forceps or any other inſtrument. The pain and terror which the making of theſe openings are ſuppoſed to excite, are the principal objections to them ; but it ſhould be remembered, that in ſuch circumſtances, it is not the preſent eaſe and conveniency of the patient that ſo particularly merit our attention, as his future advantage and ſafety. Nor will the pain induced by cutting directly upon a bullet be ſo conſiderable, as by tearing it out from a deep wound with forceps.

Where the courſe of a ball is of a conſiderable length, this will always be the eaſieſt method of taking it out, when the practice is not forbid by the contiguity of large blood veſſels and nerves : But when the wound is only of a ſhort extent, inſtead of cutting upon the ball, by making a ſmall opening into it, it anſwers better to lay the wound open through its whole length ; by which the ball is not only more eaſily extracted, but the cure is afterwards much more readily accompliſhed. Indeed this practice ſhould be adopted in all ſuch caſes, even when the ball is not lodged. When the two openings made by the entrance and exit of a ball are not very diſtant from each other, and when with ſafety they can be laid into one, it ſhould always be done as ſoon as poſſible after the accident ; by which the veſſels which have been injured will be more freely unloaded than they could poſſibly be in any other manner ; every kind of extraneous matter that the ball may have carried in, will be brought into view; and the ſides of the ſinus being allowed to collapſe, the ſize of the ſore will thus be diminiſhed.

This being done, the parts affected ſhould be covered with a pledgit of any emollient ointment formed merely of wax and oil, and a poultice of bread and milk ſhould be laid over the whole: a practice which proves much more ſucceſsful, as well as more agreeable, than the application of warm ſtimulating dreſſings; which, till of late, were univerſally uſed in every caſe of gunſhot wound. The pain and irritability which almoſt uniformly attend injuries of this kind, point out the propriety of the moſt ſoothing applications. For the moſt part thoſe we have mentioned anſwer the purpoſe: but in ſome caſes the preparations of lead anſwer better; particularly Goulard's cerate, or the common wax ointment, impregnated with a ſmall proportion of Saccharum Saturni. An opiate ſhould now be adminiſtered; and the part affected being placed in the eaſieſt and moſt convenient poſture, the patient ſhould be laid to reſt.

The formation of matter in every ſore attended with contuſion, is an object of the firſt importance; for till this takes place, there is often reaſon to ſuſpect that gangrene may ſupervene. With a view to haſten it, the warm poultices ſhould be frequently renewed: and they ſhould be continued till the tenſion and ſwelling with which wounds of this kind are uſually attended be removed, and till the ſore has acquired a red healthy granulating appearance; when it will fall to be treated in the manner we have already adviſed for ſores proceeding from any other cauſe.

Gunſhot wounds are commonly deſcribed as being covered from the firſt with deep ſloughs or eſcars; and various remedies are adviſed for removing them. Every appearance, however, of this kind with which they are attended, proceeds entirely from contuſion; and excepting the injury be large and extenſive, the ſlough covering the wound is not often perceptible; or it is ſo thin and inconſiderable, that it diſſolves and comes away with the matter of the firſt or ſecond dreſſing. In ſuch caſes, therefore, it requires no particular attention. And even when it runs to a greater depth, it commonly ſeparates ſo as to be eaſily removed as ſoon as a free formation of matter has taken place: for every ſlough of this kind is a real mortified ſpot; and we have elſewhere ſhown that nothing tends to ſeparate mortified parts with ſuch certainty from thoſe that are ſound, as a free ſuppuration being induced upon them.

In the early ſtages of gunſhot wounds, emollient poultices prove more uſeful than perhaps any other remedy: But it is neceſſary to remark, that they ſhould not be continued after the effects we have mentioned are produced: for when they are too long perſiſted in, they not only tend to relax the parts too much, and to render them ſoft and ſpongy, but are apt to induce too copious a formation of matter; from which the patient is now in greater danger than from any other circumſtances attending his ſituation: For although it is a point of the utmoſt importance in every gunſhot wound, to encourage the formation of pus to a certain extent; yet we find univerſally, that in great quantities it proves very prejudicial, and when once excited, that it is with much difficulty checked. We think it alſo right to obſerve, that this ſuperabundance of matter is very apt to proceed from a different cauſe, from the inflammation being allowed to run too high, by which extenſive effuſions and conſequent abſceſſes take place among the contiguous muſcles. This cannot in any way be ſo effectually prevented as by very copious bleedings immediately after the injury is inflicted: It is chiefly with a view indeed to prevent this diſtreſsful occurrence, that we have adviſed the practice of early and copious blood letting in every caſe of this kind; and with thoſe who have had opportunities of ſeeing the inconveniences which ariſe from thoſe extenſive ſuppurations that enſue from neglecting it, no other argument will be required to ſhow the propriety of adopting it.

In whatever manner a too copious flow of matter has been induced, the practice to be adopted muſt be the ſame. Every collection that appears muſt be diſcharged by a depending opening; the limb ſhould be laid in that poſture which will moſt readily admit of its running off; the patient ſhould be ſupported by a light nouriſhing diet; and the bark ſhould be plentifully exhibited. It is in this ſtate indeed of gunſhot wounds that bark acts with moſt advantage; when the inflammatory ſymptoms are moſtly gone, and when the patient is ſuffering from too copious a diſcharge. In this ſituation it often proves highly ſerviceable; but in order to act with advantage, it ſhould be given in conſiderable quantities. Elixir of vitriol proves in ſuch caſes a powerful addition to bark.

When notwithſtanding a liberal uſe of theſe medicines, and a proper attention to the other circumſtances we have mentioned, the diſcharge ſtill continues copious, we will often find that it is kept up by detached pieces of bone, or by pieces of cloth, or ſome other extraneous body having been carried in with the bullet. In ſuch circumſtances, nothing will tend to leſſen the quantity of matter till the extraneous body be removed; for while it remains, it will irritate and inflame the contiguous parts, and effuſion and ſuppuration will be the conſequence. The ſore ought therefore to be again examined; and any looſe body or detached pieces of bone that are diſcovered, ſhould be immediately removed. When the irritation is kept up by pieces of cloth, as they are too ſoft to be diſcovered by the probe, they are apt to paſs unnoticed. When there is therefore reaſon to ſuſpect that any article of this kind is lodged in a ſore, ſome other method is neceſſary for extracting it: And when the parts are ſo ſituated that a cord or ſeton can be introduced along the paſſage made by the ball, nothing will more readily prove ſucceſsful.

ceſsful. I have met with different inſtances of pieces of cloth being brought out with the daily drawing of a cord, which were not ſuſpected to be lodged; and in conſequence of which the ſores were ſoon cured, after various attempts to heal them had been made in vain.

We have already adviſed opium as an uſeful medicine in the early ſtages of gunſhot wounds; and by tending more effectually than any other remedy to abate irritation, it proves often ſerviceable in leſſening the diſcharge of theſe ſores, even when they have been of long duration, and when various other medicines have been employed without any advantage. It ought therefore to be preſcribed with freedom whenever the diſcharge appears to be kept up by pain or irritation.

Although in gunſhot wounds hemorrhagies of importance do not always ſucceed the accident immediately, yet they ſometimes take place afterwards. This ſeems to proceed from the arteries being left open and expoſed, when the mortified ſlough which contuſions uſually produce falls off. About this time therefore, practitioners ſhould be much on their guard againſt ſuch an occurrence, and this eſpecially when the injury is extenſive or ſeated near to any large artery. The hemorrhagy is often preceded by a great heat in the injured parts, and with a throbbing pulſatory pain. At this period it may frequently be prevented by plentiful blood letting, and eſpecially by the application of leeches to the contiguous parts; but when once the hemorrhagy appears, nothing will prove ſucceſsful, if the veſſels are of any conſiderable ſize, but a proper application of ligatures. As the diſcharge in theſe caſes is often ſo ſudden and violent as to induce much hazard before the aſſiſtance of a practitioner can be procured, patients in ſuch circumſtances ſhould be furniſhed with a tourniquet, with directions to the ſervant in attendance to apply it immediately on the firſt appearance of blood.

Hitherto we have not mentioned the ſcarifying of gunſhot wounds; a practice which we find recommended by almoſt every writer upon this ſubject, and which till of late prevailed very univerſally. By ſcarifying the ſores, it was expected that the ſloughs with which they are ſometimes covered would ſooner ſeparate, and that the cure would thereby be haſtened. Later experience, however, ſhows that this reaſoning is fallacious; and inſtead of proving uſeful, that ſcarifying very commonly does harm: It creates additional pain and inflammation, at the ſame time that it evidently extends the ſurface of the ſore, while it does not appear to be productive of any advantage. It ſhould therefore be laid altogether aſide. Even the dilatation of gunſhot wounds, ſo much recommended of late, ought to be employed with caution. When the paſſage of a ball is not extenſive, and when the parts through which it has gone can with ſafety be laid open, I believe it would be right in every caſe to do it with freedom from one end of the ſinus to the other: no harm could accrue from it; and there is reaſon to imagine, as we have obſerved above, that it would tend much to forward the cure: But I have never been able to diſcover what advantages could probably be derived from the mere dilatation of the external opening of a gunſhot wound: It is propoſed with a view to give a more free diſcharge to the matter than it would otherwiſe have: But in deep narrow wounds, formed by piſtol or muſket bullets, increaſing the diameter of one part of the ſinus will have no effect whatever upon the the reſt of it; and as it muſt evidently do harm by enlarging the wound, while no benefit can probably accrue from it, I do not heſitate in ſaying that the practice ſhould not be continued. In ſuch caſes, where the wound is either ſo ſituated that it would be dangerous to lay it open from one end to the other, or where it is of too great extent for this practice to be adopted, the paſſing a cord, as we have already adviſed, along the ſinus, will often anſwer our purpoſe. This, however, ſhould never be attempted till the firſt or inflammatory ſtage of the wound is over: for while any degree of pain or tenſion remains, the irritation produced by the cord is very apt to do harm.

But it ſometimes happens even that a cord cannot be employed, owing to the ſituation and direction of the wound. In ſuch caſes, after the pain, tenſion, and other ſymptoms of inflammation are removed, and a free ſuppuration is induced, the ſore muſt be treated in the manner we have already adviſed when ſpeaking of punctured wounds: a proper application of preſſure along the courſe of the ſinus will, in ſuch a ſituation, often effect a cure when it cannot be obtained in any other manner.

It might be expected, that ſomething ſhould be ſaid of the method of managing mortification when it occurs in gunſhot wounds; but it appears to be unneceſſary, as we have elſewhere treated fully of this ſymptom as a conſequence of inflammation.* I think it right, however, to remark, that in gunſhot wounds nothing in general proves ſo effectual in preventing mortification as plentiful evacuations of blood. It will not indeed prevent thoſe parts from mortifying which have been ſeverely contuſed by the ball coming immediately into contact with them: but this is not what in ſuch caſes we have moſt reaſon to dread; for the gangrene which occurs from the contuſion produced by the ball, is commonly circumſcribed, and it is not apt to ſpread. It is that variety of gangrene which ſucceeds to the inflammatory ſtage of gunſhot wounds, of which we have moſt cauſe to be afraid. But when blood letting is freely practiſed, it ſeldom takes place; or if it does appear, the ſame remedy will often prevent it from ſpreading.

As bark is found uſeful in many caſes of mortification, it is almoſt univerſally employed in gangrene ariſing from gunſhot wounds. I am ſatisfied, however, that the practice is often founded in error, and that much miſchief has been done by it. When gangrene occurs in a weak debilitated habit, bark may always be given with ſafety; and in ſuch circumſtances it will aften prove to be the moſt effectual remedy. But mortification which takes place from gunſhot wounds happens moſt frequently in ſtrong plethoric patients, where tonics of every kind prove prejudicial, and where blood letting and other evacuations are particularly uſeful. In the ſubſequent ſtages even of this variety of gangrene, if the diſeaſe appears to ſpread after all the ſymptoms of plethora and inflammation are removed, bark may be employed with propriety; and in ſuch circumſtances it ſhould be exhibited with freedom; but it ſhould never be given while the inflammatory tenſion and pain continue.

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* Vide Treatiſe on Ulcers, &c. Part I.

In offering theſe obſervations upon gunſhot wounds, we have hitherto been ſuppoſing that the injury is in ſome degree circumſcribed, or at leaſt that it is not ſo extenſive as to preclude hopes of ſaving the limb in which it may be ſituated; and it is proper to remark, that by due care and attention, wounds of this kind may be often cured, and limbs ſaved, where the firſt appearances were even very alarming. But when a limb is injured in ſuch a manner that there is no reaſonable hope of ſaving it, it would be improper to perſiſt long either in theſe or any other means of cure that have yet been propoſed. By doing ſo, the patient muſt ſuffer unneceſſary pain and trouble, while at the ſame time his conſtitution may be ſo much injured as to deprive him even of a chance of recovery upon the removal of the limb. But the attempt to ſave limbs which have ſuffered much by gunſhot wounds, gives riſe to a queſtion of importance, which merits particular diſcuſſion.

In the various battles which occurred in the laſt German war, the number of wounded men was often ſurpriſingly great; of courſe the amputation of limbs became frequently neceſſary. By many it was imagined that the practice was carried much farther than it ought to have been; and it was even alleged, that limbs were often wantonly removed, which with much eaſe and ſafety might have been ſaved. Among others who were of this opinion, Mr. Bilguer, ſurgeon to the armies of his Pruſſian Majeſty, wrote a treatiſe, in which he endeavours to prove, that amputation of limbs is very rarely neceſſary, as almoſt every injury for which it is uſually adviſed will admit, he thinks, of a cure, by more gentle means.

As the removal of a limb ſhould never be attempted but in caſes of real neceſſity, the public at large were much indebted to Mr. Bilguer for endeavouring to prevent a too general practice of it. There is much cauſe, however, to imagine, that the zeal with which he appears to be animated has made him carry his reſtrictions too far; and that numbers would ſuffer much unneceſſary pain, trouble, and hazard, were they to be generally adopted.

Mr. Bilguer thinks, that ſcarcely any caſe of gunſhot wound can be ſo bad as to require amputation. Even where the ſofter parts are much lacerated, and the bones and the joints much injured, we ought always, he thinks, to attempt to ſave the limb: and he aſſerts, that by this practice more lives will be preſerved than by the uſual method of proceeding immediately to amputate. After all the attention, however, that I have been able to give to a ſubject of ſuch importance, in the courſe of my own practice, and after much information obtained from others of experience and obſervation, I am of opinion, that a great deal of miſchief would be done by admitting this as an univerſal rule. I would adviſe, in every caſe where the fleſhy parts of a limb only are merely divided, to make ſome trials for ſaving it; and they will often prove ſucceſsful. Where all the muſcular parts of a limb are much contuſed and lacerated, it would no doubt be in vain to attempt the cure of it; on the contrary, it ſhould be removed at once. But when any conſiderable portion of ſoft parts remains unhurt, although the others ſhould be injured in the ſevereſt manner, if none of the large joints have ſuffered, we ſhould never deſpair of being able to ſave the limb. The contuſed parts may indeed mortify and throw off, and thus an extenſive ſore will be produced: but we know from daily experience, that the largeſt ſores will heal; and if in this we ſhould be diſappointed, we ſtill have it in our power to adviſe amputation, while both the patient and ſurgeon have the ſatisfaction to think that nothing has been omitted that could probably have prevented the neceſſity of employing a remedy of ſuch a diſagreeable nature. And on the ſubject of Amputation we ſhall afterwards have occaſion to ſhow, that in ſuch a ſituation the operation proves uſually more ſucceſsful when a ſore has been of ſome duration, than when employed immediately after the accident.

But when any of the larger joints have been much injured by the ends of the bones which compoſe them being ſhattered or ſplintered, immediate amputation ſhould always be adviſed: for the inflammation which ſucceeds to theſe wounds comes on quickly; and when once it takes place, the operation can never be employed till it be altogether removed. The height to which inflammation is in ſuch caſes apt to proceed, is a powerful argument in favour of early amputation: for when the large joints are materially hurt, the parts ſoon become highly inflamed, notwithſtanding of all that we can do to prevent it; ſo that no time ſhould be loſt in putting the operation in practice. It muſt indeed be allowed, that out of a great number of patients, ſome few might in ſuch circumſtances have their limbs ſaved, even where the joints have ſuffered in the worſt manner: But we cannot allow, with Mr. Bilguer, that this is a ſufficient reaſon for the practice which he recommends being generally admitted. It is not the ſucceſs which may attend a few caſes, by which practitioners ſhould be directed, but that which enſues from a general courſe of practice. And this I think may be conſidered as certain, that in ſuch circumſtances as we are now conſidering, more lives would be loſt by attempting to ſave the limbs of patients, than by removing them as quickly as poſſible after the injuries have been received; at the ſame time that the practice would be attended with much leſs trouble and pain to the patient: for the ſore which remains after the removal of a limb is trifling indeed, when compared with extenſive lacerated wounds of the large joints. In the preſent improved method of operating, the former often heals in the courſe of two or three weeks; whereas wounds in the joints, even when they terminate moſt favourably, often continue obſtinate, and produce much perplexity and diſtreſs for ſeveral months, or even for years.

With reſpect to fractured bones in caſes of gunſhot wounds, when a large bone is fractured or ſplintered through its whole extent, and when this is accompanied with much laceration of the correſponding ſoft parts, immediate amputation of the limb will be the ſafeſt practice, and ought therefore to be adviſed without heſitation. But where a gunſhot wound that is not very extenſive is merely accompanied with a ſimple fracture of a contiguous bone, or even where the bone is fractured in different places, if the injury does not extend to the joint, we ought in perhaps every inſtance to endeavour to ſave the limb. By removing the detached pieces of bone, and treating the ſore with attention, we will often have the ſatisfaction of accompliſhing a cure, and of reſtoring patients to the uſe of their limbs, who otherwiſe might have remained lame for life, or who might have been deprived of them entirely.

It is proper, however, to remark, that although this ſhould always be attempted where a patient is to remain in a fixed ſituation, and where the regular attendance of a practitioner can be procured, yet after engagements, whether at ſea or land, where the wounded muſt be frequently moved about, and where there is commonly a deficiency of ſurgeons, I believe it would be a good general rule to proceed to immediate amputation in every caſe of gunſhot wound accompanied with a fracture of any of the contiguous large bones. By doing ſo, a few limbs would poſſibly be removed, which with great care and attention might have been preſerved; but I am convinced that more lives would be ſaved by it than by attempting in ſuch circumſtances to purſue any other method of treatment. We ſhall have occaſion, however, to enter more fully upon the conſideration of this ſubject in the Chapter upon Amputation.

CHAPTER XXXVII.

Of BURNS.

BURNS aſſume different appearances according to their degrees of violence, and to the manner in which they are produced. Thus, burns which merely irritate the ſurface of the ſkin differ materially from thoſe which corrode or deſtroy it; while thoſe again have a different aſpect from ſuch as affect the more deep ſeated parts, as the muſcles, tendons, ligaments, &c. And we know that ſuch as occur from the application of boiling water, or any other liquid, differ materially from thoſe which are produced by the direct contact of hot metallic bodies, or of burning combuſtible materials.

Burns which do not deſtroy the cuticle, and which irritate the ſkin only, act nearly in the ſame manner with cantharides and other veſicantia. The irritation which they excite produces an increaſed action in the exhaling veſſels of the affected part, by which veſications are formed in extent and number proportioned to the violence of the cauſe. But when the ſkin or ſubjacent parts are deſtroyed, no veſicles take place. A black mortified ſlough is firſt obſerved; and when this ſeparates and is thrown off, an ulcer is left of a depth correſponding to the degree of heat by which it was produced.

In every caſe of burn the pain is ſevere; but in general it may be obſerved, that it is more conſiderable where the ſkin has been merely much fretted or irritated, than where ſuch a degree of heat is applied as to deſtroy it entirely.

In deep extenſive burns, mortification ſometimes takes place to an alarming degree very ſoon after the injury is inflicted; but for the moſt part the ſymptom we have moſt cauſe to dread is inflammation. The pain and irritation which burns excite, are in ſome inſtances ſo violent, that all our efforts are apt to fail in preventing them from inducing the very higheſt degree of inflammation: And when the ſurface of a burned part is extenſive, the effects of this inflammation are not confined to the ſpot which has more immediately ſuffered; they are apt to excite fever; and in many caſes ſuch a degree of torpor is induced, as at laſt ends in death.

In the treatment of every variety of burn, our firſt object ſhould be to procure eaſe as quickly as poſſible. Where the ſkin is not deſtroyed, but ſeems to ſuffer merely from irritation, an abatement of pain may be procured by the application of remedies of very different, and even of very oppoſite natures: By dipping the part affected in very cold water, and keeping it for ſome time immerſed in it, the pain will often be rendered very ſupportable; while on the other hand, a conſiderable degree of eaſe may be procured by plunging the injured part ſuddenly into boiling water, or any other fluid of nearly an equal degree of heat. Emollients are often employed, and in ſome caſes they procure immediate relief; but in general, aſtringent applications prove much more ſucceſsful. One of the beſt applications to every burn of this kind, is ſtrong brandy, or any other ardent ſpirits: it ſeems to induce a momentary additional pain; but this ſoon ſubſides, and is ſucceeded by an agreeable ſoothing ſenſation. It proves moſt effectual when the parts can be kept immerſed in it; but when this cannot be done, they ſhould be kept conſtantly moiſt with pieces of ſoft old linen ſoaked in ſpirits. The Acetum Lythargyrites, a ſtrong ſolution of Saccharum Saturni, or Goulard's ſaturnine water, make uſeful applications for the ſame purpoſe; and as a proof that it is the aſtringency of the remedy which the effects reſult from, the ſame benefit is derived from a ſtrong ſolution of alum, or even from common ink.

It is the common opinion, that remedies of this kind prove chiefly uſeful by preventing thoſe veſications or ſerous exſudations which ſuperficial burns are uſually attended with: But I do not find that the obſervation is well founded; for I have always remarked, that they procure an abatement of the pain ſooner where theſe veſications have already appeared, than when they are employed ſo early as to prevent them from riſing, which they frequently do when they are applied immediately after a burn is inflicted.

Whatever remedy we employ, it ought to be perſiſted in as long as the pain continues; and in extenſive burns, where the irritation is great, along with external applications, opium ſhould be preſcribed in doſes adequate to the degree of pain. Even that ſtupor with which patients in this ſituation are ſometimes attacked, is more readily removed by opium than by any other remedy. As this ſymptom is probably induced by ſome degree of effuſion upon the brain, and as we are to conſider this as an effect of the irritation which always accompanies burns, we may readily conceive that opiates ſhould prove particularly uſeful in removing it: And I have found in a variety of inſtances that they do ſo.

With reſpect to the management of the veſications; by ſome we are adviſed to open them immediately, while others aſſert that they ſhould never be meddled with. In judging from my own obſervation, I would ſay that they ſhould never be opened till the pain ariſing from the burn is entirely gone: for during this period, the leaſt acceſs of air is attended with a great deal of uneaſineſs. But when the irritation produced by the burn is ſubſided, they may be opened with ſafety: and at this period it ought always to be done; for when the ſerum is allowed to reſt long upon the ſkin beneath, it is apt to render it tender, and even to induce ſome degree of ulceration, which might with eaſe be prevented. Even at this time the veſicles ſhould be opened with ſmall punctures inſtead of large inciſions, ſo that as little air may be admitted as poſſible. And after the ſerum is diſcharged, the beſt application that can be made to the part is a thin liniment of wax and oil, with a ſmall proportion of Saccharum Saturni, ni. Oil by itſelf is too thin, as it runs quickly off; and ointments of the uſual conſiſtence give more pain than a liniment, as their ſtiffneſs prevents them either from being applied or removed ſo eaſily.

In this manner all ſuch burns as we are now treating of, may in general be cured, excepting where they are ſo extenſive as by the irritation which they produce to excite much inflammation and fever. In ſuch circumſtances, blood letting, and other remedies adapted to the particular ſymptoms, muſt be adviſed; and when the injured part is found to ulcerate, which will often happen in ſevere burns, even where the ſkin remained entire for ſeveral days, thoſe remedies muſt be employed which the nature of the ſore may appear to render neceſſary, and for which we muſt refer to the different ſections of a former publication.*

When, again, burns are from the firſt attended with loſs of ſubſtance, as uſually happens when they are produced by the application of hot metallic bodies, cooling emollient applications prove moſt effectual, the part being kept conſtantly moiſt with a liniment compoſed of equal parts of lime water and linſeed oil often gives immediate eaſe; and the eaſieſt way of applying it is, to daub the parts frequently over with a ſoft pencil well ſoaked in it. The application and removal even of the ſofteſt coverings is often productive of much pain; and I have always found in burns of this kind, that their being expoſed to the air does not for the firſt two or three days do any harm: On the contrary, it often gives relief when no advantage is derived from any application. But as ſoon as the pain and irritation produced by the burn are removed, the parts ſhould be covered and treated in the ſame manner as ulcers proceeding from any other cauſe. The liniment I have mentioned of lime water and linſeed oil, is perhaps the beſt application that has yet been employed in burns of this kind. In ſome caſes, however, I have found that more immediate eaſe has been procured from the application of Goulard's Cerate;

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* Vide Treatiſe on Ulcers, &c.

or the Unguentum Nutritum; and a weak ſolution of Saccharum Saturni has ſometimes proved ſucceſsful.

In burns ariſing from the exploſion of gun powder, ſome of the grains of the powder are apt to be forced into the cutis. At firſt they produce much irritation; and if they be not removed, they commonly leave marks, which afterwards continue fixed and permanent. They ſhould therefore be picked out with the point of a needle, or any other ſmall inſtrument, as ſoon as poſſible after the accident; and with a view to prevent inflammation, as well as to diſſolve and carry off any particles of the powder which might remain, the parts affected ſhould be kept covered for a day or two with emollient poultices. In other reſpects, injuries of this kind are to be treated in a ſimilar manner with burns produced in any other way.

When parts which lie contiguous are burnt, they are apt to adhere to each other, if ſome pains be not taken to prevent them. This is more particularly the caſe with the fingers and toes, and with the noſtrils and palpebræ. The ſureſt method of preventing it, is to keep pledgits covered with any proper dreſſings inſerted between them during the courſe of the cure.

In the treatment of ulcers ariſing from burns, it is proper to remark, that the parts are very apt to become ſoft and fungous, and to riſe conſiderably above their natural level. When this is obſerved, any emollient applications that may have been previouſly uſed ſhould be laid aſide; ſuch as are moderately aſtringent ſhould be employed inſtead of them; and gentle compreſſion with a roller proves particularly uſeful. Bathing the parts with a common Saturnine waſh, or with lime water, or a ſolution of alum, often proves ſerviceable; and one of the beſt ointments for this purpoſe is the common Ceratum e Lapide Calaminare. By perſiſting in theſe means, any fungous excreſcences of this kind will, for the moſt part, be ſoon removed; but when they prove obſtinate, they muſt be taken down by the application of burnt alum, blue vitriol, or lunar cauſtic.

EXPLANATION OF THE PLATES.

Plate XXXIX.

[Oppoſite to page 15.]

Fig 1. The knife which Mr. Pellier commonly employs in extracting the cataract. It ſhould be highly poliſhed, and ſo very ſharp as to penetrate the eye with eaſe; at the ſame time that it ſhould be of a ſufficient ſtrength for dividing the cornea without yielding. This, as well as the other two knives in this plate, are made to fit the handle I repreſented in Plate XLI. fig. 2.

Fig. 2. A knife exactly of the ſame form and ſize with the other; only in this, that ſide which paſſes next the iris is round or convex, with a view to protect that membrane from being injured, which it is apt to be when the common flat knife is employed in eyes that are not prominent.

Fig. 3. A probe pointed knife, which in ſome caſes may be employed with advantage for finiſhing the operation, when by any accident the aqueous humour eſcapes before the point of the other knife has pierced the oppoſite ſide of the cornea: But for a more particular account of the method of uſing it, we muſt refer to page 18.

Fig. 4. A pair of curved ſciſſors of a proper ſize for every operation on the eyes where ſciſſors are needed: Indeed every operator who practiſes much in this branch ſhould be provided with them.

Fig. 5. This is the only ſpeculum which Mr. Pellier employs. It may be made of gold or ſilver wire, or of any other metal. It is here repreſented of the full ſize both in length and in thickneſs of wire. In uſing it, one of the curves at *A* or *B* is placed upon the upper eyelid directly behind the cartilaginous

boarder; and being given to an aſſiſtant, a degree of force is applied with it ſufficient for fixing the eye; which is eaſily done, if the operator at the ſame time makes ſome reſiſtance by placing the index and middle fingers of one hand on the under edge of the orbit ſo as to compreſs the eye beneath.

All the inſtruments of this plate are repreſented of the full ſize.

PLATE XL.

[Oppoſite to page 24.]

Fig. 1. A curved needle fixed in a handle for the purpoſe of paſſing ligatures beneath the pterigium and other ſmall excreſcences, which now and then occur within the orbit, and even upon the eye itſelf. I have elſewhere ſhown that they may be removed without this precaution:* but as Mr. Pellier is accuſtomed to employ a ligature, I think it right to deſcribe his method of inſerting it. Fig. 1. is intended for tumors on the right eye, and to be uſed with the left hand of the ſurgeon. Fig. 4. is for the left eye, and to be uſed with the right hand.

Figs. 2. and 3. An inſtrument which Mr. Pellier names a Ciſtatome, from his uſing it in particular caſes for opening the capſule of the cryſtalline lens. It may be made of gold or any other metal. In uſing it, he holds it between the thumb and two fore fingers of his right hand; taking care to place the thumb upon the button *A* or *C*, which is connected with a ſheath that covers the ſharp point *B*. The hand being ſupported upon the cheek by the ring finger and little finger, the point of the inſtrument covered with the ſheath muſt be cautiouſly paſſed through the pupil till it reaches the lens; when the button *C* being drawn back with the thumb, the point of the inſtrument will thus be ſet at liberty without the hand being moved. This is an ingenious invention, and anſwers the purpoſe with eaſe and ſafety.

Theſe inſtruments are all repreſented of the full ſize.

PLATE

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* Vide Chap. XXVII. Sect. VIII.

PLATE XLI.

[Oppoſite to page 30.]

Fig. 1. An inſtrument for depreſſing the under eye lid. When an aſſiſtant cannot be procured, it may often prove uſeful. The two flat hooks at the upper end of it being fixed upon the cartilaginous edge of the eyelid, the other end of it hanging over the cheek, by its weight draws it conſiderably down.

Fig. 2. A knife which Mr. Pellier employs in ſome caſes for the operation of extracting the cataract. It is fixed in the handle at *B* by a male ſcrew fitted to a female ſcrew, which is turned by the nut *A*. This handle may be made to anſwer figures 4. and 5. as well as every knife employed in operations on the eyes.

Fig. 3. An inſtrument for determining the quantity of ſkin to be removed in the operation for the Trichiaſis or Inverſion of the eyelids. When it is found neceſſary to remove a portion of ſkin from beneath the under eyelid, or from the ſuperior part of the upper palpebra, it may be done with a common ſcalpel, while an aſſiſtant ſupports or elevates it from the parts beneath either with his fingers alone or with forceps made for the purpoſe; but this inſtrument anſwers better, as by means of it the quantity of parts to be removed can be aſcertained and cut off with more preciſion.

Fig. 4. A knife for opening ſmall collections of matter on any part of the eyeball. Being blunt on the back and round on the end, it is uſed without any riſk of injuring the contiguous parts.

Fig. 5. A ſharp pointed curved knife, for dividing the veſſels of the eye or of the palpebræ.

Theſe inſtruments are all delineated of the full ſize.

PLATE XLII.

[Oppoſite to page 33.]

Fig. 1. A ſmall ſcoop, which anſwers better than any other inſtrument for removing ſmall ſtones, peas, or any other ſubſtances from the noſtrils or ears.

Figs. 2. 3. 4. 5. and 6. Are inſtruments employed by Mr. Pellier for the operation of the Fiſtula Lachrymalis. Fig. 2. is a perforator and conductor for clearing the paſſage through the os unguis into the noſe. Figs. 5. and 6. are tubes for leaving in the paſſage. Fig. 3. is a compreſſor for fixing them after they are inſerted; and the eaſieſt method of inſerting a tube is by putting it upon the conductor after it is paſſed through the compreſſor, as is repreſented in fig. 4. The conductor armed with the tube and the compreſſor being paſſed through the paſſage into the noſe, muſt be withdrawn; when, by means of the compreſſor, the tube may be firmly fixed.

Theſe inſtruments are all repreſented of the full ſize.

PLATE XLIII.

[Oppoſite to page 42.]

Fig. 1. Forceps of a convenient form for extracting ſmall bones or other ſubſtances from the throat.

Fig. 2. An inſtrument for preventing the noſtrils from collapſing after the operation deſcribed page 85, *A B*, Two moveable tubes for inſerting into the noſtrils, to be retained in their ſituation by a ribbon paſſed through the openings *C D*, and tied on the back part of the head.

Fig. 3. A ſide view of one of the tubes.

Theſe inſtruments are all repreſented of the full ſize. They, as well as ſome others in this Volume, are taken from ſome elegant engravings publiſhed by Mr. Bambrilla of Vienna.

PLATE XLIV.

[Oppoſite to page 60.]

Fig. 1. A double canula for the purpoſe of fixing ligatures upon polypous excreſcences either in the noſe, throat, ears, or vagina. The ligature paſſed through it may either be of catgut or pliable ſilver wire.

Fig. 4. Is a canula for the ſame purpoſe, but of a different conſtruction. When the other is uſed, the ligature is tied round the handles of the inſtrument. In this the ligature paſſes through a moveable handle, and is eaſily turned to any degree of tightneſs.

Fig. 2. Is a canula of the ſame kind with the others; but being crooked, it is better calculated for removing polypi that are deeply ſeated in the throat. The method of uſing theſe inſtruments is deſcribed in different parts of Section V. Chapter XXVII.

Fig. 3. Is an inſtrument for paſſing a ligature over the uvula. A thread being paſſed through the tubular part of the handle with the probe *A*, a nooſe muſt be formed upon it; and being lodged in the groove on the inſide of the ring, the other end of the thread muſt be paſſed through the two ſmall holes on the outſides of the ring; and thus it is ready for uſe. It is commonly termed the Ring of Hildanus, from the name of its inventor. All theſe inſtruments are repreſented of the full ſize.

PLATE XLV.

[Oppoſite to page 64.]

Fig. 1. A ſection of the bones of the head, repreſenting a polypus in the throat hanging down behind the velum pendulum palati, with a ligature paſſed over it and fixed at the root of it, with a double canula inſerted through one of the noſtrils.

Fig. 2. This figure is taken from Mr. Cheſelden. It repreſents a polypus in the noſe, with part of it paſſing back into the throat, and the reſt into the noſtril, with a ligature inſerted from the noſtril into the throat, in ſuch a manner as to include the root of the excreſcence in its doubling. By afterwards twiſting the ends of it, a degree of compreſſion may be applied upon the root of the polypus ſufficient for removing it; but it would not anſwer in every caſe; and as the method with the canula is not only more eaſy but more effectual, the other will never probably be uſed.

PLATE XLVI.

[Oppoſite to page 65.]

Fig. 1. A polypus of ſuch a ſize that it diſtended the noſtril completely. It was removed with a ligature as is here repreſented. *A*, The extremity of the polypus which appeared without the noſtril. *C*, a probe of ſilver or any other metal, ſplit at the end, in ſuch a manner as to retain a piece of catgut or ſilver wire; the doubling of which being inſerted into it, ſhould be puſhed up to the root of the polypus on one ſide, while the tube *B* being paſſed upon the two ends of it, muſt be puſhed up to the root of it on the oppoſite ſide, when the ligature may be eaſily drawn to any neceſſary degree of tightneſs.

Fig. 3. A ſlit-curved probe, which may be uſed for the ſame purpoſe, viz. for applying a ligature to the root of a polypus in tumors ſeated in the throat. By this ſimple invention a ligature may be carried to the root of every polypus that can occur, however much the noſtril may be diſtended by it.

PLATE XLVII.

[Oppoſite to page 66.]

Fig. 1. An inſtrument for the purpoſe of applying cauſtic to any part of the mouth or throat. It may be made of ſilver or any other metal. *A*, A moveable tube in which the cauſtic muſt be fixed, when by pulling the ring at the other end, it muſt be drawn ſo far into the ſurrounding canula as to be completely covered with it; when the end of the inſtrument being applied upon the part affected, the cauſtic muſt be again puſhed forward to a proper length, which may be always aſcertained with exactneſs by means of the ſmall pin tied by a thread to the ring at the oppoſite end of it. This, as well as the inſtruments of Plate XLVI. I am favoured with by Dr. Monro, whoſe improvements in ſurgery are numerous and important.

Figs. 2. 3. and 4. Are different parts of an inſtrument mentioned in page 61 for the purpoſe of putting a ligature round a polypus in the throat.

Fig. 2. A waxed thread with a nooſe adapted to the ſize of the groove in the ring *CD*, fig. 3. *ED*, *EC*, Two tubular pieces of braſs, two inches and a half long, ſupporting the ring which is placed horizontally upon them. At the upper ends of each they ſhould be made perfectly ſmooth and round, ſo as to allow the thread to ſlide more eaſily, and to prevent it from being cut by the edges of the tubes. *CD*, The apertures where the ends of the thread are inſerted. *E*, one of the openings at which they are brought out. The other opening cannot be ſeen in this view of the inſtrument. The handle of the inſtrument is of ſtrong braſs wire ſeven or eight inches long, and is bent a little that it may be the more eaſily introduced.

Fig. 4. An inſtrument for making a ſecond nooſe. *F*, Two braſs wheels fixed in a ſmall caſe of braſs. The two wheels are five eighths of an inch broad, and half an inch deep. After forming a ſecond nooſe, the ends of the thread ſhould be paſſed over the wheels in the manner here repreſented, when the handle of the inſtrument being puſhed upwards, a knot may be formed of any degree of tightneſs.

This inſtrument is evidently formed upon the ſame principle with the ring of Hildanus, Plate XLIV. fig. 3.

PLATE XLVIII.

[Oppoſite to page 68.]

Fig. 1. Curved forceps for extracting polypi from the throat, and from behind the velum pendulum palati.

Fig. 2. Straight forceps for extracting polypi from the noſtrils.

Fig. 3. Forceps for the ſame purpoſe with the laſt, but ſomewhat different in form. The method of uſing both theſe and the others is deſcribed in Chap. XXVIII. Sect. V.

PLATE XLIX.

[Oppoſite to page 77.]

Figs. 1. 2. and 3. Different forms of curved ſciſſors for extirpating tumors within the mouth, as well as for other purpoſes.

Fig. 4. An inſtrument nearly of the form of a fleme, which anſwers better than any other for ſcarifying the gums of children in dentition.

PLATE L.

[Oppoſite to page 82.]

Fig. 1. A ſcarificator for ſeparating the gums from the roots of teeth intended to be extracted: It ſhould be very ſharp, but at the ſame time not ſo fine in the point or edge as to be hurt by being inſinuated between the gums and the teeth.

Fig. 2. A curved trocar for perforating the antrum maxillare.

Figs. 3. and 4. Two diſſecting hooks with two and three prongs, which anſwer better for many purpoſes than the ſingle pronged hook in common uſe.

PLATE LI.

[Oppoſite to page 85.]

Fig. 1. An inſtrument for paſſing a ligature round the uvula or any other pendulous excreſcence in the throat; but although the propoſal is ingenious, it does not anſwer the purpoſe ſo well as the inſtruments delineated in Plate XLIV. figs. 1. 2. 3. and 4.

Fig. 2. An inſtrument firſt propoſed by Mr. Cheſelden for tying a knot upon ſchirrous amygdalæ after paſſing a ligature through the baſis of the tumors, in the manner repreſented in fig. 3. The pin in fig. 2. is meant to repreſent a part upon which a knot is to be formed.

PLATE LII.

[Oppoſite to page 87.]

Fig. 1. An inſtrument for removing the uvula by exciſion. That part of the uvula intended to be removed

moved being paſſed through the opening in the body of the inſtrument, the cutting ſlider, which ought to be very ſharp, muſt be preſſed forward with ſufficient firmneſs for dividing it from the parts above.

Fig. 3. A curved probe pointed biſtoury for removing ſmall tumors in the throat or any part of the mouth: And fig. 2. forceps for laying hold of tumors intended to be removed in this manner.

PLATE LIII.

[Oppoſite to page 90.]

Figs. 1. and 2. Two ſcarificators of different forms for opening abſceſſes in the throat, and for ſcarifying the amygdalæ. The two wings with which the canula of fig. 1. is furniſhed, are intended for compreſſing the tongue, while the point of the inſtrument is paſſed more deeply into the throat.

Figs. 2. and 4. Mr. Mudge's machine for conveying ſteams of warm water and other liquids to the throat and breaſt. Fig. 2. The inhaler as it appears when fitted for uſe, except that the grating *A*, which then ought to cover the hole, is now turned back, to ſhow the opening into the valve. Fig. 4. A ſection of the cover, in which is ſhown the conſtruction of the cork valve *B*, and alſo the conical part *C*, into which the flexible tube *D* is fixed.

When the inhaler, which holds about a pint, after being three parts filled with hot water, is fixed at the arm pit under the bed clothes, the end of the tube *E* is to be applied to the mouth; the air, in the act of inſpiration, then ruſhes into the apertures *F*, and paſſing through the hollow handle, and afterwards into a hole in the lower part, where it is ſoldered to the body, and therefore cannot be repreſented, it riſes through the hot water, and is received into the lungs, impregnated with vapour. In exſpiration, the contents of the lungs are diſcharged upon the ſurface of the water; and inſtead of forcing the water back through the hollow handle, the air eſcapes by lifting the round light cork valve *B*, ſo as to ſettle upon the ſurface of the body under the bed clothes.

Thus the whole act of reſpiration is performed, without removing the inſtrument from the mouth.

The flexible part of the tube *D* is about ſix inches long, fitted with a wooden mouth piece *E* at one end, and a part *G* of the ſame materials at the other, to be received into the cone *C* on the cover. This flexible tube is made by winding a long ſlip of ſilk oil ſkin over a ſpiral braſs wire. This ſhould be then covered with one of the ſame ſize, of thin ſilk, and both be ſecured by ſtrong ſewing ſilk wound ſpirally round them. Some length and degree of flexibility is neceſſary to this tube, for the ſake of a convenient accommodation to the mouth when the head is laid on the pillow.

Care ſhould be taken by the workman, that the cover be made to fit very exactly; or, if it does not do ſo, the defect ſhould be remedied by winding a piece of cotton wick, or ſome ſuch contrivance, round the rim underneath the cover, ſo as to make it air tight. The cork, likewiſe, which forms the valve, ſhould, for the ſame reaſon, be made as round as poſſible. It is alſo neceſſary to remark, that the area of the holes on the upper part of the handle taken together; the ſize of the hole in the lower part of the handle which opens into the inhaler; the opening of the conical valve itſelf; and that in the mouth piece; as well as the cavity or inſide of the flexible tube, ſhould be all equally large, and of ſuch dimenſions, as to equal the ſize of both noſtrils taken together: in ſhort, they ſhould be ſeverally ſo large, as not only not to obſtruct each other, but that reſpiration may be performed through them with no more labour than is exerted in ordinary breathing.

Plate LIV.

[Oppoſite to page 106.]

Fig. 1. A ſpeculum oris, which I propoſed a conſiderable time ago, and which in different caſes has

been uſed with advantage. By occupying leſs ſpace in the mouth than the inſtruments in common uſe, it may be employed where they are inadmiſſible. *B*, the handle through which the ſcrew *A C* is paſſed, by which the plate of iron *D* may be more or leſs ſeparated from the fixed plate *E*, by turning the nut *A*. The plates *D E* ſhould be ſufficiently firm for reſiſting the preſſure of the jaws, and they ſhould be covered with leather or cloth to prevent the teeth from being injured.

Fig. 2. Another form of a ſpeculum for the mouth. *G H*, two firm iron plates, which being inſerted between the teeth of the upper and under jaw, may be ſeparated to any neceſſary degree by turning the handle *F*. The farther extremity of the plate *G* is intended to compreſs the tongue, an addition which may be eaſily made to fig 1.

Fig. 3. The inſtrument in common uſe as a ſpeculum oris, but it is ſo defective that it can ſeldom be uſed with much advantage.

PLATE LV.

[Oppoſite to page 110.]

Fig. 1. Forceps for laying hold of the lip in performing the operation for the hare lip. It may be done with the fingers alone, but the parts cannot be ſo neatly cut in this manner as when the forceps are employed.

Fig. 2. A kind of cutting forceps, the invention of Dr. John Aitken: They may be employed either in the hare lip, or in the removal of cancerous affections of the lip: One blade of the forceps is a plane ſmooth ſurface, while the other is furniſhed with a ſharp cutting edge. In uſing this inſtrument the two blades muſt be preſſed againſt each other with one hand, with a force ſufficient to divide the parts that are meant to be cut; while the other hand is employed in ſecuring the handles.

PLATE

PLATE LVI.

[Oppoſite to page 118.]

Fig. 1. Sciſſors of a ſize and ſtrength ſufficient for dividing the parts in the operation for the hare lip. It is not probable they will ever be generally employed, but I think it right to delineate a ſize of the inſtrument which by experience is found to anſwer.

Fig. 2. Cutting pliers for the purpoſe of removing ſmall ſplinters of bone wherever they are met with.

PLATE LVII.

[Oppoſite to page 124.]

As the treatment of the hare lip is a point of much importance, I have judged it proper to delineate the appearance of the diſeaſe, together with that of the parts in which it is ſeated during the different ſtages of the operation and cure.

Fig. 1. A caſe of hare lip in the upper lip. *A*, one of the inciſores appearing in the centre of the opening, which ought to be removed before the operation, as a tooth in this ſituation is very apt to interrupt the cure. *BB*, the unequal edges of the fiſſure with which this affection is very commonly attended.

Fig. 2. The appearance of the parts after the edges of the fiſſure have been removed and the pins introduced. *CC*, the edges of the cut, which ought to be ſmooth, equal, and exactly of the ſame length on each ſide, ſo that when drawn together no inequality may be perceptible. The firſt pin ſhould be inſerted near to the under part of the lip, and the upper pin near to the ſuperior point of the fiſſure. The pins repreſented in this figure are furniſhed with moveable ſteel points, ſo that the points may be taken away on the ligatures being applied, as is delineated in fig. 3. which exhibits the appearance of a hare lip immediately after the operation.

Fig. 4. A lip after the cure is completed: *D*, repreſents the appearance of the cicatrix, which in general ſhould be nearly a ſtraight line.

Fig. 5. A flat pin for the operation of the hare lip. The pin itſelf, fig. 6. ſhould be of gold, and the point, fig. 7. of ſteel.

PLATE LVIII.

[Oppoſite to page 128.]

Figs. 1. 2. 3. 4. and 5. Different forms of ſcaling inſtruments for removing tartar and other extraneous matter from the teeth.

Figs. 6. and 7. Inſtruments that may be employed either for burning the nerve of a tooth, or for ſtuffing a hollow tooth with gold or lead. Fig. 8. may likewiſe be employed for the ſame purpoſe, but it is more frequently uſed for ſearching behind and between the teeth when there is any ſuſpicion of a latent caries that is not readily diſcovered.

Fig. 9. Another inſtrument for ſtuffing carious teeth. And,

Fig. 10. A handle to which all theſe inſtruments may be fitted.

PLATE LIX.

[Oppoſite to page 145.]

Fig. 1. The inſtrument commonly termed a Key for extracting teeth. After a variety of alterations in the form of it, the one here delineated is the beſt I have ever uſed.

In fig. 2. the inſtrument in common uſe, the claw is fixed, and can only be moved by taking out the ſcrew by which it is connected with the inſtrument; but in this it may be moved from one ſide to another, merely by preſſing upon the nut *A*, by which the ſpring *B* is raiſed out of a nitch in a wheel which is thus rendered moveable, and in which the claw is fixed. *D*, the heel of the inſtrument, which is here repreſented not only of a greater depth, but conſiderably longer than it is uſually made: Of this length it is applied to a conſiderable extent of gums, by which the jaw is not ſo apt to ſuffer as when it is much ſhorter; and of this depth it acts with more power than when of the uſual form. This part of the inſtrument ſhould not only be well poliſhed, but it ought to be quickly covered with ſeveral plies of ſoft old linen, in order to render the preſſure produced by it upon the gums as eaſy as poſſible. The handle *E* is ſometimes made of iron; but it anſwers better either of ivory or timber.

Fig. 3. A claw bent in ſuch a manner, that when the heel of the inſtrument *D* is placed upon any part of the gums, the ſecond or third tooth farther in the mouth may be pulled with it. This proves ſometimes uſeful, where the gums oppoſite to the affected tooth are particularly tender; and it ſhould always be employed when it is meant to pull either of the two fartheſt molares of the lower jaw outwards; for when the common inſtrument is uſed, the gums which cover the projecting part of the coronoid proceſs of the jaw are always much lacerated.

Figs. 4. and 5. Two claws of different ſizes of the ordinary form.

PLATE LX.

[Oppoſite to page 152.]

Figs. 1. and 3. Two inſtruments much employed in different parts of Europe for extracting teeth. They do not, however, poſſeſs any advantage over the key inſtrument; and they are liable to this objection, that they cannot be uſed where it is neceſſary to turn a tooth towards the inſide of the mouth.

Fig. 1. *A*, The fulcrum, which ought to be well covered with ſoft old linen. *B*, the claw fixed to the handle E, by a ſmall hole in the end of it, which receives a knob of a correſponding ſize at *C*, and it is retained in its ſituation by a moveable plate of poliſhed iron *D*. The handle ſhould be wood, and all the reſt of the inſtrument of iron or ſteel. Fig. 2. A claw

with a conſiderable degree of curvature, for extracting teeth at a greater depth in the mouth than the fulcrum can be placed at.

Fig. 3. *F*, the fulcrum. *E*, a ſtraight claw fixed to the inſtrument by a ſcrew at *H*. *I*, the handle, which ſhould be of wood.

PLATE LXI.

[Oppoſite to page 149.]

Figs. 1. 3. and 4. Different forms of forceps for extracting teeth. Fig. 3. is perhaps the moſt uſeful of any.

Fig. 2. Small diſſecting forceps employed in different operations in the mouth, as well as in other parts.

PLATE LXII.

[Oppoſite to page 153.]

Fig. 1. Teeth forceps with moveable claws. And,

Fig. 2. A fulcrum to be uſed along with them, both deſcribed in page 153.

Fig. 3. An inſtrument for dividing the frenum linguæ, deſcribed in page 75.

PLATE LXIII.

[Oppoſite to page 157.]

Figs. 1. 2. and 3. Different forms of a punch or lever for extracting ſtumps of teeth. The method of uſing them is deſcribed page 157. Figs. 1. and 3. are the beſt. They conſiſt of two parallel plates of poliſhed iron, which may be ſeparated more or leſs by preſſing the moveable ſiders *AB* higher or lower.

Figs. 4. 5. 6. and 7. Different forms of files for removing inequalities upon the teeth.

PLATE LXIV.

[Oppoſite to page 187.]

Figs. 1. 2. and 3. Different forms of inſtruments employed for concentrating ſound in caſes of deafneſs, deſcribed in page 187.

Fig. 4. A ſyringe of a proper ſize for waſhing the meatus auditorius externus.

Figs. 5. and 6. Inſtruments for perforating the lobes of the ear, deſcribed in page 188.

PLATE LXV.

[Oppoſite to page 192.]

Figs. 1. 2. and 3. Different forms of glaſſes for drawing milk from the breaſts of women. With figs. 1. and 3. the breaſt may either be ſucked by the perſon herſelf, or by an aſſiſtant; and fig. 2. is a glaſs cup, mounted with a bag of elaſtic gum. *A*, the glaſs cup joined to the bag *C* by the intervention of a braſs tube *B*. They are more particularly mentioned in page 192.

PLATE LXVI.

[Oppoſite to page 193.]

Fig. 1. An inſtrument mentioned in page 192, for ſupporting the head after the operation for the wry neck. *ABC*, a curved plate of iron fitted to the ſhoulder, and ſupporting another plate, to the top of which is connected the plate *DEF*, upon which the head is meant to reſt, and which therefore ſhould be covered with ſoft leather or cotton. *GHI*, a buckle and ſtrap for fixing the inſtrument round the neck.

Figs. 2. 3. and 4. Different kinds of cups, which may be either of ivory, lead, or ſilver, for covering the nipples and protecting them from the clothes, when they are either chopped or otherwiſe diſeaſed. The holes in their brims are for receiving pieces of ſmall tape for fixing them round the body.

Fig. 5. A broad flat needle, of a lancet form, for introducing cords or ſetons in different parts of the body.

PLATE LXVII.

[Oppoſite to page 226.]

Figs. 1. 2. 3. and 4. are different repreſentations of the edges of wounds drawn together, and retained by adheſive plaſters, as mentioned in page 226.

PLATE LXVIII.

[Oppoſite to page 268.]

The different figures in this plate repreſent an apparatus for the cure of a rupture of the tendo Achillis. An explanation of it is given in page 268, &c.

PLATE LXIX.

[Oppoſite to page 284.]

The figure in this plate is the invention of Mr. Chabert, of Paris, and is taken from the ſecond volume of Memoirs of the Royal Academy of Surgery: It is the beſt inſtrument that has yet been publiſhed for compreſſing the jugular veins.

It conſiſts of two curved pieces of ſteel, *AA*, connected by a joint at the back part of the machine, *D*. One of the ſides terminates in a horizontal plate, *B*; the teeth of which paſſing through a hole in the oppoſite plate, the preſſure made with it may be increaſed or diminiſhed at pleaſure. The cuſhion, *C*, is meant to be placed upon the jugular vein, either upon a bleeding orifice in caſes of hemorrhagy, or immediately below the opening to be made into it where blood is to be taken from this vein. This cuſhion ſhould be moveable, ſo as to paſs with eaſe from one part of the inſtrument to another. Every part of the machine, excepting the plate *B*, ſhould be covered with ſoft leather.

END OF VOL. III.

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